

Public Information Materials

9/19/01
Restoration Advisory Board Meeting
Held at Irvine City Hall
Irvine, CA

Materials/Handouts Include:

- RAB Meeting Agenda/Public Notice – 9/19/01 RAB meeting.
- Meeting Minutes from the July 25, 2001 RAB Meeting – 52st RAB.
- MCAS El Toro RAB Meeting Schedule, Full RAB and RAB Subcommittee (Sept. 2001 – July 2002).
- MCAS El Toro RAB Mission Statement and Operating Procedures.
- RAB Membership Application – MCAS El Toro RAB.
- MCAS El Toro Installation Restoration Program – Mailing List Coupon.
- MCAS El Toro Administrative Record File - Information Sheet (for on-Station access).
- MCAS El Toro Information Repository - Information Sheet.
- MCAS El Toro Where To Get More Information Sheet.
- Internet Access – Environmental Web Sites.
- MCAS El Toro Marine Corps/Navy RAB Co-Chair (address, telephone, fax, e-mail).
- MCAS El Toro - For More Information on Redevelopment.
- MCAS El Toro RAB Acronyms and Glossary of Technical Terms.
- MCAS El Toro Base Realignment and Closure Business Plan, Introduction Section, March 2001.
- MCAS El Toro Environmental Compliance Program Documentation Update (Sept 13, 2001); and Location of Concern (LOC) Status Table (September 19, 2001).
- *Presentation* – MCAS El Toro Installation Restoration Program Status Update, September 19, 2001, Presented by Dean Gould, BRAC Environmental Coordinator.
- *Presentation* – Compliance Program update, MCAS El Toro Restoration Advisory Board Meeting, September 19, 2001, Presented by Dhananjay Rawal, IT Corporation.
- *Presentation* – Status of Radiological Surveys, MCAS El Toro Restoration Advisory Board Meeting, September 19, 2001, Presented by Dean Gould; Prepared by Roy F. Weston, Inc.
- *Presentation* – Aquifer Test IRP Site 2, MCAS El Toro Restoration Advisory Board Meeting, September 19, 2001, Presented by Crispin Wanyoike, Earth Tech Inc.

Agency Comments and Letters - U.S. Environmental Protection Agency (U.S. EPA)

- U.S. EPA Comments on the Draft Technical Memorandum Phase II Evaluation of Radionuclides in Groundwater at the Former Landfill Sites and EOD Range, Marine Corp Air Station, El Toro - To: Dean Gould BEC, MCAS El Toro; From: Nicole G. Moutoux, Remedial Project Manager, U.S. EPA (letter dated August 14, 2001).
- U.S. EPA Comments and Review on the Draft Site Closure Report, Vandose Zone Remediation IRP Site 24, Marine Corps Air Station, El Toro – To: Dean Gould BEC, MCAS El Toro; From: Nicole G. Moutoux, Remedial Project manager, U.S. EPA (letter dated August 14, 2001).
- U.S. EPA Comments on Draft Proposed Plan for Site 16, Marine Corps Air Station, El Toro – To: Dean Gould BEC, MCAS El Toro; From: Nicole G. Moutoux, Remedial Project Manager, U.S. EPA (letter dated August 16, 2001).

Agency Comments and Letters – California Environmental Protection Agency (Cal-EPA)

- Cal-EPA, Department of Toxic Substances Control (DTSC) – Draft Site Closure Report, Vandose Zone Remediation, Operable Unit (OU) 2A, IRP Site 24, Volatile Organic Compound (VOC) Source Area, MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro; From: Triss M. Chesney, Remedial Project Manager, DTSC (letter dated August 13, 2001).
- Cal-EPA, Department of Toxic Substances Control (DTSC) – Draft Final Phase II Focused Feasibility Study, Operable Unit (OU) 3, Installation Restoration Program (IRP) Site 16, Crash Crew Training Pit No. 2, MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro; From: Triss M. Chesney, Remedial Project Manager, DTSC (letter dated August 17, 2001).

California Regional Water Quality Control Board (RWQCB), Santa Ana Region

- California Regional Water Quality Control Board (RWQCB)– Comments on 30% Submittal Remedial Design Operable Unit 2B, Landfill Sites 2 and 17, former MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated August 7, 2001).
- RWQCB, Santa Ana Region – Comments on Draft Site-Specific Environmental Baseline Survey Report, IRP Site 1, Explosive Ordnance Disposal Range and Draft Federal Agency –To- Agency Property Transfer, Environmental Summary Documents For Certain Property (Parcel 5A2), MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated August 13, 2001).
- RWQCB, Santa Ana Region – Comments on Draft Site Closure Report, Vandose Zone Remediation, Volatile Organic Compound Source Area, IR Site 24, MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated August 20, 2001).
- RWQCB, Comments on Draft Final Phase II Focused Feasibility Study Report, OU-3, Site 16, Former MCAS El Toro – To Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated August 27, 2001).
- RWQCB, Comments on Summary Report on Former Silver Recovery Unit (SRU 3B) at Building 133, Former MCAS, El Toro - To Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated September 10, 2001).
- RWQCB, Comments on Summary Report on Former Silver Recovery Unit (SRU) Number 3A, Building 46, Former MCAS, El Toro – To Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated September 10, 2001).

**MCAS El Toro
Restoration Advisory Board**

*Irvine City Hall
Conference and Training Center
One Civic Center Plaza, Irvine*

September 19, 2001

6:30-9:00 p.m

53rd Meeting

M60050.002566
MCAS EL TORO
SSIC # 5090.3

**RAB Subcommittee Meeting
5:00-6:00 p.m., Room L-104**

AGENDA

RAB members that are unable to attend please call either Dean Gould, Marine Corps/Navy RAB Co-Chair at (949) 726-5398 or (619) 532-0765 -or- Greg Hurley, RAB Community Co-Chair at (949) 719-2289.

Question and Answer (Q&A) Ground Rules

- Q&A follows individual presentations; time designated for presentations includes Q&A time.
- "Open Q&A" session (environmental topics) is at the end of the New Business segment.
- After adjournment, Marine Corps/Navy representatives are available to answer more questions.

Welcome/Introductions/Agenda Review (6:30-6:40)

Dean Gould
Marine Corps/Navy RAB Co-Chair

Old Business (6:40-7:05)

Approval of 7/25/01 Minutes (6:40-6:45)

Greg Hurley
RAB Community Co-Chair

Announcements/Review of Action Items (6:45-6:55)

Dean Gould & Greg Hurley

Subcommittee Meeting Report (6:55-7:05)

Marcia Rudolph
RAB Subcommittee Chair

New Business (7:05-8:55)

Regulatory Agency Comment Update (7:05-7:20)

Nicole
Moutoux
U.S. EPA

Triss
Chesney
*Cal-EPA
DTSC*

Patricia
Hannon
RWQCB

- Nomination Process – Dr. Chuck Bennett Memorial Award
(7:20-7:25)

Dean Gould

- Installation Restoration Program Sites Overview
and Update (7:25-7:40)

Dean Gould

- Update on Tank 555 and Tech Memo on Closure of
on-Station JP-5 Fuel Pipeline Components (7:40-8:05)

Dhananjay Rawal
OHM/IT Corp.

BREAK -- 10 minutes

- Radiological Survey Fieldwork Update (8:15-8:30)

Bruce Christensen
Roy F. Weston, Inc.

- Draft Work Plan Installation Restoration Program
Site 2 Aquifer Test (8:30-8:50)

Crispin Wanyoike
Earth Tech, Inc

Open Q&A (Environmental Topics) (8:50-8:55)

Dean Gould

Meeting Summary & Closing (8:55-9:00)

Greg Hurley & Dean Gould

Meeting Evaluation & Suggested Topics for Future Meetings

P U B L I C N O T I C E

MARINE CORPS AIR STATION EL TORO
Restoration Advisory Board Meeting



53rd Meeting
Wednesday, September 19, 2001
6:30 - 9:00 p.m.

Irvine City Hall
Conference and Training Center
One Civic Center Plaza, Irvine

The Restoration Advisory Board (RAB) is composed of concerned citizens and government representatives involved in the environmental cleanup program at MCAS El Toro since 1994. Community participation and input is important and appreciated. This meeting will feature the following activities and presentations specific to MCAS El Toro:

- Installation Restoration Program Sites Overview and Update
- Update on Tank 555 and Tech Memo on Closure of on-Station JP-5 Fuel Pipeline Components
- Radiological Survey Fieldwork Update
- Draft Work Plan Installation Restoration Program Site 2 Aquifer Test



For more information about this meeting and the Installation Restoration Program at the MCAS El Toro, please contact:

Base Realignment and Closure
Mr. Dean Gould
BRAC Environmental Coordinator
P.O. Box 51718, Irvine, CA 92619-1718
(949) 726-5398 or 726-2840 or (619) 532-0784

MARINE CORPS AIR STATION EL TORO
RESTORATION ADVISORY BOARD MEETING

July 25, 2001 – 52nd Meeting

MEETING MINUTES

The 52nd Restoration Advisory Board (RAB) meeting for Marine Corps Air Station (MCAS) El Toro was held Wednesday, July 25, 2001 at the Irvine City Hall. The meeting began at 6:40 p.m. These minutes summarize the discussions and presentations from the RAB meeting.

WELCOME, INTRODUCTIONS, AGENDA REVIEW

Mr. Dean Gould, BRAC Environmental Coordinator (BEC) for MCAS El Toro and Marine Corps RAB Co-Chair, called the 52nd RAB meeting to order. He asked all those present to introduce themselves and self-introductions were made by all present. Mr. Gould presented an overview of the agenda.

OLD BUSINESS

Review and Approval of the May 30, 2001 Meeting Minutes

Mr. Gould announced that Mr. Greg Hurley, RAB Community Co-Chair, would be late for tonight's meeting. He added that RAB members Marcia Rudolph and Gail Reavis and regular RAB meeting attendee, Ray Ouellette, had also informed him that they would not be able to attend tonight.

In Mr. Hurley's absence Mr. Gould asked if there were any comments on the RAB meeting minutes for May 30, 2001. Mr. Crispin Wanyoike, Earth Tech, Inc., provided a clarification regarding the sewer line associated with Building 307. He said that the sewer line that runs from Building 307 to the main trunk line is a 6-inch cast iron pipe, and the rest of the line is 8-inch vitrified-clay pipe. Mr. Wanyoike also clarified that samples would be collected approximately every 85 feet along the sewer line not the 50-foot intervals he stated at the last RAB meeting. With these amendments, Mr. Novel James RAB member, asked for approval of the May 30, 2001 meeting minutes. Mr. Jerry Werner, RAB member, seconded the motion and the minutes were approved.

Announcements

- Mr. Gould noted that Mr. Jeffrey Koepke has resigned from the RAB due to job and time constraints. He encouraged those present to provide information on parties who would be interested in replacing him.
- Mr. Gould reviewed the schedule for the full RAB and RAB Subcommittee meetings through July 2002 and urged those present at tonight's meeting to attend regularly. He noted that RAB Subcommittee meetings are chaired by Ms. Marcia Rudolph and take place before the RAB meetings in Room L-104 here at Irvine City Hall.
- Mr. Gould confirmed that the next RAB meeting would be held on Wednesday, September 19, 2001.

- Mr. Gould pointed out that there are a number of sources for information about the environmental program at MCAS El Toro. He introduced Ms. Marge Flesch (*replacement for Charly Wiemert*) [(949) 726-2840], who is the point-of-contact for the Administrative Record (AR) file for MCAS El Toro as well as MCAS Tustin. She is available to assist AR users in locating documents or making photocopies. The AR is located at Building 368 at MCAS El Toro and contains all documentation regarding the Installation Restoration Program (IRP) at the Station. If you would like to review AR documents, please call Ms. Flesch to make arrangements.
- Mr. Gould provided the location information for the MCAS El Toro Information Repository (IR) which is located at the Heritage Park Regional Library in Irvine and urged attendees to take advantage of these resources (the AR and IR). The IR is the second location that houses information related to the environmental investigation and cleanup at MCAS El Toro (see page 15 for the address and hours of operation).
- Mr. Gould provided the MCAS El Toro contact list of project staff and noted that BCT members and public participation specialists on the list can provide direction on where to get more information on MCAS El Toro activities.
- Mr. Gould said copies of the updated Upcoming Documents List ("Blue Sheet") are available on the sign-in table. This sheet provides a list of major MCAS El Toro documents and the date they will be available for review by the RAB. He noted that Mr. Hurley and Ms. Rudolph receive copies of all the documents and letters that are issued for MCAS El Toro. These documents are also available at the IR and the AR.
- Mr. Gould said that there have been requests from RAB members for copies of the letters that are sent out by the Navy. He said that the Navy is now copying Ms. Rudolph and Mr. Hurley on virtually everything the Navy sends out, including documents for review and letters. He said that the feedback regarding the distribution of documents to the RAB Community Co-Chair and RAB Subcommittee Chair has been quite positive.
- Mr. Gould pointed out that a request was made by the RAB Subcommittee for a list of locations where concentrations of contaminants in groundwater exceed the maximum contaminant levels or MCLs. This list is currently being compiled and will be provided to the RAB Subcommittee at a later date.
- Mr. Gould stated that RAB members presently have an opportunity to go out to the field and observe the Radiological Survey. He said that there has been very limited response (only two individuals have taken advantage of this opportunity) from the public, considering the level of interest on this issue. He said that the survey is scheduled to last approximately another month and a half. Mr. Werner asked about the hours and days of when the Radiological Survey is occurring and noted that a local television manager wanted to watch the survey as it is being conducted. He asked if the survey is performed on Saturdays. Mr. Bruce Christensen, Roy F. Weston, Inc., responded that work hours typically are 8:00 a.m. to 4:00 p.m., Monday through Friday.
- Ms. Ellen Kaylin, RAB meeting attendee, asked whether an update to the 1999 fact sheet on the Interim Remedial Action at Site 24 had been issued. She noted that there have been health problems in her family and expressed her concern that the volatile organic compound (VOC) plume has moved from near Woodridge to under Westpark since 1999. Mr. Gould replied that an update on Site 24 will be provided as part of the meeting presentations later on this evening.

RAB Subcommittee Meeting Report, Ms. Marcia Rudolph, RAB Subcommittee Chair

In the absence of Ms. Rudolph, RAB Subcommittee Chair, the RAB Subcommittee Meeting Report was not presented.

NEW BUSINESS

◆ Regulatory Agency Comment Update

Triss Chesney, Project Manager, Cal-EPA Dept. of Toxic Substances Control (DTSC)

Ms. Chesney said that DTSC is in the process of reviewing the Draft Site Closure Report for Vadose Zone Remediation at Site 24, the Draft Final Feasibility Study for Site 16, the Draft Technical Memorandum for Phase II Radionuclides in groundwater at former Landfill Sites and also for Site 1 Explosive Ordnance Disposal Range. She also has copies of two letters tonight: (1) Comments on the Draft Work Plan for the Preliminary Assessment at Building 307, that requested additional historical and background information to determine the basis for the work plan; and (2) Comments on the Draft Technical Memorandum for Replacement Well Installation and Groundwater Evaluation, requesting additional information on how the wells are sampled.

Patricia Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (RWQCB)

Ms. Hannon said that the Santa Ana RWQCB is in the process of reviewing the 30% Design Submittal for Sites 2 and 17 Landfill Covers, the Technical Memorandum for Operable Unit (OU) 1 Alternative 8A, the Draft Site Closure Report for Vadose Zone Remediation at Site 24, and the Technical Memorandum for Well Replacement and Groundwater Evaluation. Ms. Hannon stated that three letters are available tonight: (1) concurrence letter stating the RWQCB has no comments on the Site 1 Unexploded Ordnance (UXO) Surface Sweep Work Plan; (2) concurrence letter stating the RWQCB has no comments on the Draft Work Plan for the Preliminary Assessment of Building 307; and (3) the letter transmitting the signed Final Record of Decision for Sites 7 and 14. Mr. Werner asked what the main comments were in each of these letters. Ms. Hannon replied that, she did not have any comments on the Site 1 Work Plan. For the Preliminary Assessment of Building 307, she concurred with the work plan. The letter for the Record of Decision is only a letter indicating that RWQCB has signed the ROD. Ms. Hannon added that she expects to have quite a few comments on the 30% Design Submittal by the next RAB meeting and will also have several closure letters for underground storage tanks.

Nicole Moutoux, Project Manager, U.S. Environmental Protection Agency (EPA) Region IX

Ms. Moutoux was not in attendance. Therefore no U.S. EPA update was provided.

◆ Final Results and Conclusions – Phase II Supplemental Radionuclide Evaluation Update – Crispin Wanyoike, Earth Tech, Inc.

Mr. Gould introduced Mr. Crispin Wanyoike who is here tonight to provide an update on the investigation of radionuclides in groundwater at MCAS El Toro. Mr. Gould added that a water district

representative will comment on this evaluation as well, because samples were split with the water districts for laboratory analysis.

Mr. Wanyoike reminded the audience that the purpose of this investigation is to determine whether the radionuclides that are present in groundwater are naturally occurring or are the result of past Station operations. Mr. Wanyoike noted that he anticipates that this will be the final update that will be necessary on this issue.

Background

Mr. Wanyoike said that radionuclides were detected in groundwater at MCAS El Toro during the remedial investigation (RI). In some cases, levels of radionuclides (e.g., gross alpha, gross beta and uranium), were above drinking water standards. He noted that the Navy is also in the process of conducting a Radiological Survey for radionuclides in soil and buildings at various sites at the Station. In 1998, the Navy prepared a technical memorandum evaluating existing RI data for the occurrence of radionuclides and the potential sources within the Station. Following the memorandum, the Navy conducted a Phase I Supplemental Radionuclide Investigation. The conclusion of this investigation, as presented in a Technical Memorandum issued in 2000, was that the radionuclides present in groundwater at MCAS El Toro are naturally occurring. However, review of the memorandum by the BCT and the regulatory agencies' experts and RAB members showed that the analytical methods used were not precise enough to make a definitive conclusion on the origin of the radionuclides.

Mr. Wanyoike explained that Phase II of the investigation was performed to evaluate the presence of radionuclides in groundwater at seven locations, including the four landfill sites, Site 1 (the Exploded Ordnance Disposal [EOD] range), Site 4 (the Ferrocene Spill Area), and within the trichloroethene (TCE) groundwater plume that originates at Site 24. The Phase II investigation was designed to confirm the conclusions of previous investigations regarding the origin of radionuclides in groundwater and to collect groundwater samples for analyses by the Orange County Water District (OCWD) and the Irvine Ranch Water District (IRWD) in support of the design for the Irvine Desalter Project (IDP). The technical approach was developed in close consultation and with the cooperation of the U.S. EPA, the RWQCB, the DTSC, and the OCWD/IRWD.

Investigation

Mr. Wanyoike said that 23 groundwater monitoring wells were sampled. This includes 17 wells from the Phase I investigation and 6 wells from the on-site portion of the TCE plume. Samples were analyzed at three laboratories – GeoChron Laboratories, associated with the Massachusetts Institute of Technology (MIT); Paragon Analytics; and Lawrence Livermore National Laboratory for OCWD/IRWD. The laboratories provided input on how samples should be collected using ultra-pure clean water to avoid introducing extraneous factors into the results.

Mr. Wanyoike stated that each laboratory has its own analytical methods for radionuclides. GeoChron (MIT) uses thermal ionization mass spectrometry (TIMS) to evaluate the isotopic ratio for Uranium-235 and Uranium-238. Paragon Analytics was used to measure gross alpha and gross beta, radium, and Strontium-90. Paragon Analytics was also used to confirm a previous detection of Americum-241 (Americum-241 was not found to be present). Lawrence Livermore, on behalf of the water districts, has also evaluated the two methods, both the TIMS used by GeoChron, and Inductively Coupled Plasma Mass Spectrometry (ICPMS), their own high technology method of determining Uranium-235 and Uranium-238 concentrations and their respective ratios in soil in groundwater. Mr. Wanyoike noted that the ICPMS method is the more cost effective method for determining these ratios.

Analytical Laboratory Results and Conclusions

Mr. Wanyoike presented a table comparing the Uranium-235 and Uranium-238 ratios from samples that were analyzed at GeoChron and Lawrence Livermore. The table showed that the ratios from both laboratories were essentially identical. The ratios were also very close to the ratio of Uranium-238 to Uranium-235 in nature ($U^{238}:U^{235} = 137.88$), showing that the uranium isotopes in groundwater are naturally occurring at MCAS El Toro. He also noted that Strontium-90 was not detected in groundwater samples from the one well that previously had elevated gross beta concentrations.

Mr. Wanyoike concluded that the two laboratories confirmed that the radionuclides in groundwater are naturally occurring and are not anthropogenic (manmade). These conclusions are presented in the Draft Technical Memorandum for Phase II I Radionuclide Evaluation which was issued in July 2001. He said that they anticipate that the Final Technical Memorandum will be issued in August 2001. This document recommends that no further evaluation on the origin of radionuclides at MCAS El Toro is required. The groundwater monitoring for gross alpha and gross beta will continue. However, the monitoring program will be reviewed to determine whether it is still necessary to monitor for other radionuclides.

Discussion

Mr. Fred Meier, RAB member, asked if the uranium ratios reported by the laboratories were good or bad. Mr. Wanyoike responded that the ratios were good because they indicated that the uranium that is present at MCAS El Toro is naturally occurring.

Ms. Kaylin noted that the first round of tests indicated that toxic materials were there. Now it appears that they are not there. Where did these materials go? Mr. Wanyoike responded that radionuclides occur naturally in groundwater. The original investigation concluded that the radionuclides at MCAS El Toro are naturally occurring. However, the analytical methods used in the first tests did not provide definitive data. This time two laboratories were used. The results confirmed that the radionuclides are naturally occurring. She asked if the radionuclides are still there and what is being done.

Mr. Roy Herndon, RAB member representing the Orange County Water District (OCWD), responded that the water districts paid Lawrence Livermore to provide an independent third party analysis. This independent analysis, also concluded that the radionuclides at MCAS El Toro are naturally occurring. Mr. Herndon explained what it means for the radionuclides to be naturally occurring. He stated that many part of the United States have naturally occurring uranium in the groundwater. In this area, natural concentrations of uranium are extremely low and meet drinking water standards. He added that regarding manmade radionuclides there is no evidence of impact from Station operations at MCAS El Toro. Mr. Herndon concluded by saying that the water districts see nothing that gives them cause for concern.

[Note: Due to mechanical difficulties with the projector equipment needed for the Desalter Update, the order of presentations, as presented on the agenda, was switched at this point.]

◆ Status of Radiological Surveys – Bruce Christensen, Roy F. Weston, Inc

Mr. Christensen marked up a map of MCAS El Toro to show areas that have undergone a radiological survey to date and areas that the Navy intends to survey in the future. He explained that the Historical Radiological Assessment (HRA) was finalized in May 2000 and the Radiological

Survey Plan was finalized in January 2001. The on-site radiological surveys were started on June 18, 2001. If no remediation is required, Mr. Christensen said that the radiological survey will be complete in September 2001. Assuming that no remediation is required, once the survey is complete, a radiological release report will be produced.

Mr. Christensen said that to date, radiological surveys have been performed at the Nuclear, Biological, Chemical (NBC) outdoor areas, the suspected former site of the Radium Plaque Adaptometer Building, Defense Utilization and Marketing Office (DRMO) Storage Area Yard 3 and Installation Restoration (IR) Sites 3 and 5 (including APHO-46). The survey of the DRMO Yard 1 is approximately 90% complete. Radiological surveys are also in progress at IR Sites 12 and 25. Next week the survey will take place across Irvine Boulevard at Anomaly Area 3 near the housing area. Other areas remaining to be surveyed include Hangar 295, Buildings 242, 243, and 244, DRMO Buildings 319 and 360, the NBC Buildings 787, 1789 and 1803, the EOD Range (IR Site 1), Magazine Road Landfill (IR Site 2), and the Communications Station Landfill (IR Site 17, including APHO-44).

Radiation Survey Results

Mr. Christensen presented the survey results for the Perimeter Road Landfill (IR Site 5), the Original Landfill (IR Site 3), the DRMO Yard 1 (IR Site 8), and DRMO Yard 3 (Area of Concern [AOC] 264). The Site 5 Perimeter Road Landfill is approximately 5 acres in extent. The radiological survey covered approximately 7 acres, intentionally going outside the site boundaries for completeness. The survey of Site 5 identified one potential anomaly area that registered 15 times the survey investigation level. This means that if a person were to stand at this one place for 2,000 hours he/she would receive a radiation dose approximately equivalent to one chest x-ray. Mr. Christensen stressed that the survey is very sensitive and that the Navy is looking for very minute amounts of radioactivity. A sample will be taken from the potential anomaly area and analyzed for radioisotope(s) present.

The Site 3 the Original Landfill has an area of approximately 12 acres, with a surveyed area of 13.1 acres. The survey of Site 3 included 1.3 million high density survey data points. One potential anomaly area that registered 5 times the investigation level was identified on the east side of Agua Chino Wash. A potential complication at Site 3 is that approximately half of this landfill site is covered with crushed rock or gravel that is suspected to contain some granite. Granite contains a small amount of the naturally occurring isotope Radium-226 making this rock naturally radioactive. The crushed rock reads approximately 1.2 times the survey investigation level, so the rock will be sampled to ensure that the radiation is naturally occurring. Portions of the Site 3 Original Landfill with areas that are covered by crushed rock contain several areas with readings between 2 and 5 times the survey investigation level. These areas will have 6 to 8 solid soil samples collected to determine the presence of residual radioactivity to verify that the radiation in the material giving the elevated readings is naturally occurring.

The Site 8 DRMO Yard 1 has some areas (0.5 acre) remaining to be surveyed. To date, 250,000 high-density data points have been collected, and 8 to 10 potential anomalies have been found at the site with radiation levels at 3 to 6 times the investigation level. These areas will be further investigated and samples will be sent to a laboratory for isotopic analysis. Mr. Christensen pointed out that frequently an area with several "hits" actually represents a single anomaly. This anomaly area is likely close to the surface and should not be difficult to locate. Other areas with multiple hits were also identified at DRMO Yard 1. In all likelihood, they each represent a single anomaly.

DRMO Yard 3 was very clean. The entire 2.5 acres were surveyed and no anomalies were reported. Therefore, no additional surveys or sampling will be performed at this area. Portions of DRMO Yard 3 had to be surveyed using a backpack due to a small hill and small depression present at the site. The backpack was also used around the fence and in an area between two buildings. In this manner, the Navy was able to survey all accessible horizontal ground in the area.

Mr. Don Zwiefel, RAB member, asked whether this is just a surface survey? Mr. Christensen responded that this survey technology can reliably detect anomalies to a depth of approximately 18 inches below ground surface. Anomalies can also be detected below asphalt and gravel, however the depth of detection is less than 18 inches. He noted that anomalies under concrete essentially cannot be detected, which is why this material is typically used for radiation shielding. Mr. Zweifel stated that most DRMO yards have a lot of concrete slabs. Mr. Christensen replied that, unlike landfills, at DRMO yards items are not normally buried and are therefore found on top of the ground or well within the first 18 inches, with most items located within a couple of inches below ground surface. The equipment that is being used for this survey is very sensitive. He also noted that based on the experience obtained at DRMO yards at another base, the yards at MCAS El Toro are relatively clean, although there were some anomalies at Yard 1. He said that Yard 1 is the oldest yard and has been in existence since World War II.

Mr. Gould pointed out that some anomalies may be found at the landfills. If this occurs, further sampling will be conducted, and the material may be removed. He also pointed out that the remedy for closure of the landfills typically calls for a 4-foot layer of soil that will be added on top of the existing landfill covers. This soil will act as a barrier that is protective of human health.

Mr. Christensen noted that there are differences in the radioactive materials found at military bases where such materials were "used" than those locations where these materials were "produced." At sites such as MCAS El Toro, where radioactive materials were used but not produced, radioactive items are expected to be present as a complete solid piece, rather than particles, liquids or gases. Therefore, the main concern is the radiation that the object is emitting might present a hazard to a person that is very close to it or comes in contact with it. These solid materials are not expected to migrate to or threaten groundwater.

Next Steps

Mr. Christensen then discussed the next steps, noting that Mr. Wanyoike's group is looking at radionuclides in groundwater and his group is looking at soil and buildings. Therefore, when these investigations are finished, there will have been a very complete radiological characterization of MCAS El Toro. He noted that the next step is to complete the radiological characterization survey and sampling of the buildings and sites identified in the Radiological Survey Plan by September 2001. Based on the surveys and samples collected, the Navy will determine if remediation is required. If so, a Radiological Work Plan will be prepared to perform the necessary remediation. If remediation is not required, a Radiological Release Report will be issued. He added that during this entire process, the regulators and the public will be involved.

Discussion

Mr. Meier asked whether there is a picture of the surveying equipment available. Mr. Christensen responded that he did not bring pictures, but that the high-density survey equipment is an eight detector array mounted on a trailer that is pulled by small tractor. The survey is performed using global positioning system coordinates and 100% of the accessible areas are surveyed. The tractor has been designed and calibrated to move at a maximum speed of 18-inches a second, or less than 1 mile per hour. The backpack survey equipment uses a single detector, weighs 35 pounds and has a 10-foot high antenna. In small areas a cart mounted onto a frame with bicycle wheels can be used. The cart has three detectors and an antenna.

Mr. Werner asked if an anomaly is found and removed, is this considered remediation? Mr. Christensen responded that an anomaly located on the surface would be removed and packaged. He further explained that surface samples are typically collected within the first 6 inches below ground surface using a trowel to scoop the sample into a collection bag. If after sampling, the radioactivity is no longer detected, it might be considered "remediation by sampling." If the radiation is not removed, the Navy would need to look at remediation options and make a decision on how to proceed. He added that radioactive material removed during sampling would be stored in a container in a locked area.

Ms. Kaylin asked what is the significance of 4 inches and 18 inches? Mr. Christensen replied that he had mentioned that surface samples are typically collected within six inches of ground surface. The Multi-Agency Radiation Survey and Site Investigation Manual that is being used as guidance for this work discusses surface surveys as those conducted within the first six inches of soil. However, the equipment that is being used by the Navy at MCAS El Toro and other bases can "see into" the soil to a depth of 18 inches to detect anomalies. Therefore, it may be necessary, in some instances to sample to a depth greater than 6 inches.

Ms. Kaylin asked what is the significance of the 15 times the acceptable level. Mr. Christensen clarified that what she is referring to is not termed an acceptable level but a survey investigation level that was established with concurrence of the regulatory agencies. The survey investigation level is a background level of radioactivity that was established from a minimum of 20 readings taken at a clean site in the area, plus 3 standard deviations. This investigation level is barely detectable above the background level that might be found in this room. Ms. Kaylin asked what happens if the radiation is less than 15 times the survey investigation level? Does the Navy just not bother with it? Mr. Christensen explained that at the landfills where readings were as low as 1.2 times the survey investigation level the Navy will collect samples. These samples will be used to determine whether the elevated reading in the area represents a source of radiation that was a result of Station operations or is naturally occurring. Also, samples will be collected at several of the gravel covered areas mentioned earlier to determine if the gravel is the source of some of the elevated readings.

Mr. Zwiefel stated that he recently had seen an ionization detector that costs \$250. He asked if such a device has ever been used at the Station? Mr. Christensen responded that he did not know the answer to this question, as there is very little radiological history available because there was very limited work done on base that involved radiological components. He noted that materials such as radium dials, which have also been used in wrist watches, were known to have been present at MCAS El Toro as they were at every other military base with World War II vintage aircraft, vehicles, and ships. The use of the radium dials was phased out in the early 1960s. Ice detection and some

other safety equipment on aircraft contained Strontium-90. Equipment containing sealed Strontium-90 would be sent to the base to replace a failed component on a one-to-one basis. The failed component would then be sent back to the manufacturer for repair. The use of such radioactive materials, therefore, would not result in alpha or beta particle release. He also noted that scintillation counters were being used for surveying the landfills. In this case, the Navy was looking for gamma radiation, or photons, such as what would be released from cobalt, radium, thorium, or strontium components. Inside the buildings, alpha and beta detectors are used in addition to gamma detectors because there is more potential in buildings for surface contamination to be detected.

Mr. Zwiefel said that former employees have told him that MCAS El Toro was a regional repair shop for radium dials. He noted that the late Dr. Charles Bennett was concerned about this and the drain pipes that were found to contain radium. Mr. Christensen responded that a radium room did, in fact, exist in Building 296. However, the Station was not licensed to paint radium dials. Instead, the radium dials were cleaned in the radium room. As a result, some radium particles went into the building's drain pipes. These drain pipes from Building 296 were attached to the industrial waste treatment drain pipe which connected to the former Industrial Waste Treatment Plant (Site 12). This drain pipe was removed up to a point where no more radium was detected. Surveys and samples were taken from the downstream manholes in the area. All manholes were determined to be free of contamination. At this time, the Radiological Survey is underway at Site 12, the Industrial Waste Treatment Plant, including the drying beds and Bee Canyon Wash (Site 25) downstream of the drying beds.

Mr. Gould asked if there was a clear path from the radium room to the Industrial Waste Treatment Plant. Mr. Christensen reiterated that piping in Building 296 was removed until there were no longer any traces of radium. Then samples were taken outside the building in manholes and no evidence of radium contamination was found. Therefore, there is no evidence that radium particles from the radium room reached the Industrial Waste Treatment Plant. The site of the former Industrial Water Treatment Plant is being surveyed to provide more confidence so the Navy can state conclusively that no contamination was left behind.

Mr. Bob Coleman, community relations support for the Navy CLEAN program, mentioned that he had the opportunity to see the high-density survey equipment in operation today and recommended that others go observe the survey underway at MCAS El Toro. The equipment has been specifically engineered to perform the type of radiological survey required at the Station.

◆ **Irvine Desalter Project – Richard Bell, P.E., Irvine Ranch Water District**

Mr. Gould introduced Mr. Richard Bell, RAB member that represents the Irvine Ranch Water District (IRWD) who will be making a more detailed presentation about the Irvine Desalter Project (IDP). The IDP is a groundwater restoration program that involves the cooperative efforts of the IRWD, OCWD, the U.S. Navy, the U.S. Department of Justice, and the Metropolitan Water District (MWD).

Background

Mr. Bell stated that over the period 1985 to 1987, groundwater contamination was found beneath MCAS El Toro and central Irvine. The contamination was found by the OCWD during routine monitoring and came from aircraft degreasing products and cleaning solvents that were disposed of onto the ground. These are volatile organic compounds (VOCs) and those individuals that disposed

of the products thought they would evaporate or volatilize. Some of the materials did; however, some also went into the soil and groundwater. VOCs are now present in a groundwater plume that is up to 2 miles wide and 3.5 miles long. [R. Bell later confirmed that the length of the plume is 3.5 miles not 6.5 miles.] In addition to the VOCs, the groundwater in Irvine also contains high levels of total dissolved solids (TDS) and nitrates from natural sources and past agricultural practices.

Mr. Bell presented a map showing the extent of the VOC plume in groundwater. Near the aircraft hangars where the VOC plume originates, the plume is confined to the shallow groundwater unit. At some point downstream of the hangars, the clay layers in the soil are not continuous and allow the contamination to migrate down into the principal aquifer. Mr. Bell pointed out the extent of the groundwater plume. Within the colored portion of the plume, the groundwater contains more than 5 microgram per liter ($\mu\text{g/L}$) of TCE, the main contaminant in the plume. Groundwater containing 5 $\mu\text{g/L}$ or greater of TCE is above the level allowed in drinking water. He noted that the map also shows proposed pipelines and treatment facility locations for the IDP.

Mr. Bell stated that in early 1986, IRWD initiated planning for the IDP. The planning was held up when TCE was discovered in the IDP well area in 1986-1987. At that time, investigations were expanded to determine the nature, extent, and source of the VOC contamination. By 1989, the Department of the Navy (DON) and the water districts knew that there was a significant plume and an early action project was constructed, known as the "TCE Pump Out Well." By 1990, the DON became convinced that they were responsible for the plume and MCAS El Toro became a "Superfund" site.

Mr. Bell explained that in 1992, meetings between the DON and the water districts began. From 1993 through 1996, the DON paid the \$2.6 million cost of the monitoring wells and the TCE Pump Out Well. In 1994, OCWD/IRWD initiated joint negotiations with DON and the Department of Justice (DOJ) in order to come to an agreement on how to best utilize the IDP when addressing the VOC contamination in the plume. In 1999, a focus group consisting of randomly selected residents and IRWD customers met to discuss the IDP. This focus group process showed that residents support a cleanup process where a dual systems (potable and non-potable) are used and where the water removed from the TCE plume is cleaned up is used only for non-potable purposes, such as irrigation. The negotiations between the DON/DOJ and OCWD/IRWD resulted in the development of a Settlement Agreement. On June 6, 2001, OCWD approved and signed the Settlement Agreement with DON/DOJ. On June 11, 2001, the IRWD also approved and signed the Settlement Agreement. The legal counsel for the OCWD/IRWD has also determined that an addendum summarizing the minor changes to the project made since the EIR was approved would need to be added to the required California Environmental Quality Act documentation. The DON just signed the Settlement Agreement and DOJ is expected to sign within 4 to 6 weeks.

Mr. Bell explained that there are several reasons why the IDP is necessary. First, it protects and cleans the groundwater basin and stops the spread of the VOC plume towards drinking water supply wells. Secondly, it develops the Irvine Subbasin for potable use. Thirdly, it improves the reliability of the water supply. He noted that the groundwater needs to be cleaned up no matter what happens with the MCAS El Toro base.

Project Description

Mr. Bell stated that the IDP is actually two projects in one. In the non-potable portion of the project, water from the plume will be treated and used for non-potable purposes such as landscape irrigation.

In the potable portion of the project, water from areas outside the plume will be treated to remove TDS and nitrates. The treated water will then be added to IRWD's drinking supply.

Mr. Bell said that public safety will be ensured because OCWD/IRWD will cleanup both the on-base and off-base contaminated groundwater using proven treatment processes. Water will be tested before and after it is treated and all project water will be treated to better than drinking water standards.

- Groundwater from inside the plume will be desalted to reduce salts and air stripped to remove VOCs:
- 50% of the groundwater will be treated by reverse osmosis.
- 100% will be air stripped and disinfected before it is pumped into the non-potable water system.
- Groundwater from outside the plume will be desalted to reduce salts:
- 67% of the water from outside the plume will be desalted using reverse osmosis and disinfected before it is pumped into the drinking water system for use.

Mr. Bell presented a conceptual figure of the IDP. He made note of the non-potable piping system. This system will accept groundwater at the boundary of the base for treatment at the treatment plant. Once it has been treated, the treated water will be pumped to the non-potable distribution system. He pointed out the locations that represent the potable wells that are located upgradient of the plume. Groundwater from these wells will be treated in a separate plant at the same location. Waste salts from the treatment process will be discharged through the sanitary sewer pipeline to the ocean.

Mr. Bell stated that in the potable system, approximately 6,400 acre-foot/year (afy) will be extracted from the deep aquifer safely upgradient of the contaminated plume. In the non-potable system, 2,452 afy per year will be extracted, and that includes 648 afy of shallow groundwater that will be delivered by the Navy from the VOC Source Area (Site 24 on-base) to the IDP. An additional 1,814 afy will be extracted from the deep aquifer within the off-base plume.

Mr. Bell explained that the goal for the TDS concentration in potable water is 420 milligrams per liter (mg/L). This is lower than the existing quality of the potable water which is 550 mg/L. The goal for non-potable water will be a TDS concentration of 670 mg/L. Raw untreated groundwater that will be treated is expected to have a concentration of 1,000 mg/L and the non-potable system a concentration of 1,074 mg/L. The initial non-potable concentrations are higher than the initial potable concentrations because there is a higher concentration of TDS in the shallow groundwater unit than in the principal aquifer.

Mr. Bell explained that costs of the project will be borne by the DON, the Metropolitan Water District (MWD), and the IRWD. The DON will pay the cost for cleanup of the VOC-contaminated plume. The MWD will contribute \$250 an acre foot for desalting the water. The IRWD will finance the project and pay the water supply and distribution costs. There will be no extra costs to the consumer.

Mr. Bell stated that there are several major project agreements involved. The first set of agreements is between the OCWD/IRWD and DON/DOJ. These include a Settlement Agreement, a Shallow Groundwater Unit Contract, and procurement of Pollution Liability Insurance. The second set of agreements is between OCWD and IRWD. These include a Restated Project Agreement and an Environmental Impact Report (EIR) Addendum that have both been approved. The OCWD also granted a Basin Equity Assessment Exemption as an incentive to use the treated groundwater rather

than imported water. There is also another agreement the water districts have with MWD called the MWD Groundwater Recovery Agreement.

Mr. Bell reviewed the key principles in the Settlement Agreement. According to this agreement, OCWD/IRWD will manage off-base production and all treatment of groundwater. The DON will manage on-base Shallow Groundwater Unit production. The DON/DOJ will pay the capital and operation and maintenance (O&M) costs for VOC removal and their share of the extraction wells and collection system costs. The DON/DOJ will also pay for broad coverage pollution insurance which will cover such a case where an unknown contaminant is found or new contaminants are added to regulations that cannot be removed by the treatment system. OCWD/ICWD will provide the DON with a limited liability release with a re-opener clause for any new contaminants that might be found in principal aquifer potable wells.

Mr. Bell said that the MWD Groundwater Recovery Agreement is important because it helps to offset the desalting costs and makes the project economically feasible. Agreements between the water districts are important because they ensure that the project complies with the California Environmental Quality Act and clarifies the relationships of groundwater basin management and retail water system provider roles. He explained that under the water districts' agreements, OCWD is the lead agency and IRWD is the responsible agency. The EIR for the project was certified by OCWD in 1990. The EIR was subsequently revised and Addendum Number 1 was certified by OCWD in 1993. Later, the change to a dual potable and non-potable system was found by legal counsel to require a new addendum. The OCWD Board certified Addendum Number 2 on June 11, 2001.

Mr. Bell stated that the benefits of the IDP are that it reverses long-term rising water levels that are increasing the flow of salts and VOCs to the main water basin while it cleans up the salts and VOC contamination. The environmental impacts of the project are that it will use electrical energy and water treatment chemicals and will produce wastewater brine flows as a residual product. There will also be minor land use impacts from the facilities and typical construction-related impacts. He also said that the IDP resolves the long-standing issues of groundwater cleanup. The project will restore the groundwater basin, produce high-quality water that meets all state and federal standards for potable and non-potable uses, and be cost-effective.

Mr. Bell stated that the capital cost of the IDP is estimated at \$28,720,000. This includes the cost of the potable system (\$17,720,000) and the non-potable system (\$11,000,000). The O&M cost are estimated to be approximately \$2,964,000 million per year.

Mr. Bell presented a table showing the key steps and the time frame to implement the project. The OCWD/IRWD Board actions took place in June 2001. The DON signed the agreements in July 2001 and DOJ is expected to sign the Settlement Agreement and Shallow Groundwater Unit Contract by August 2001. Once these documents are signed, the DON will be able to issue a Proposed Plan to the public in September 2001, with a Draft Record of Decision (ROD) to follow in December 2001. Project design is expected to be awarded in November 2001. The ROD is expected to be finalized in May 2002 and a preliminary design report issued in June 2002. Final design is expected to be complete in June 2003 and construction is expected to be complete in April 2005.

Discussion

Mr. Zwiefel asked what the cost of the IDP will be when compared to purchasing water from the MWD? Mr. Bell responded that the potable water costs will be comparable to MWD costs which now are \$431 an acre foot if purchased from the MWD. Non-potable water will cost about \$240 an acre foot, which is comparable with purchasing irrigation water from the MWD.

Mr. Zwiefel asked why it will take 5 more years to complete this project? Mr. Bell responded that is the time that it takes to design and build the treatment plant and construct the wells and piping. He pointed out that this is as fast as the project can be built.

Ms. Kaylin suggested that the water districts take a survey of people and find out who is ill in the area. The survey should also measure the perception of the type and clarity of water used in the homes in Irvine. She noted that there is a huge industry for bottled water (not just designer bottles). Ms. Kaylin suggested the survey be sent to offices, companies, and people throughout the area. She also asked that Mr. Bell clarify why the IDP-treated water would be cleaned up better than the water that was previously offered? Mr. Bell responded that the water district is comfortable in knowing that its water is safe and good tasting. The IRWD samples and tests its water all the time and so does the MWD. He also pointed out that there were 80 to 90 people in the focus group, and that group had a high satisfaction with the service and quality of water that is being produced. The water that is being discussed for the IDP is water that is currently not being used. He suggested that Ms. Kaylin call the IRWD Community Relations Department for more information. Mr. Gould mentioned that the purpose of RAB meetings is to remain focused on the Installation Restoration Program, and cleanup of the base. For water district specific issues, individuals should follow up with the points of contact mentioned by Mr. Bell.

Mr. Werner asked Mr. Bell to clarify the MWD rebate of \$250 an acre foot. He asked if this lowers the cost of treating the water? Mr. Bell said that the rebate does lower the cost of the treated water so it is comparable and close to the MWD cost for such water. He said that the project would not be feasible otherwise.

Mr. Peter Hersh, RAB member, asked why some water is not being treated? Mr. Bell responded that it is not necessary to desalt all the groundwater to reduce the concentrations of TDS to the desired cleanup level. Therefore, only approximately two-thirds of the water will need to be circulated through the system for the potable system and about 50% for the non-potable system. All the VOC water will be treated with state-of-the-art air stripping technology.

Mr. Gould noted that Duncan Holaday, Assistant Secretary of the Navy for Installations and the Environment, signed the Settlement Agreement last week. The DOJ is expected to sign in 4 to 6 weeks. The Proposed Plan and public comment period are expected in the October 2001 time frame. Mr. Herndon pointed out that the blue sheet (showing the upcoming documents for RAB review) has September 7, 2001 as the beginning of the public comment period. He asked if this is inaccurate? Mr. Gould responded that this is not accurate. A Federal Facilities Agreement (FFA) extension will be needed to change the date. This extension has not been readied yet for the BCT.

◆ **Status Update IRP Site 1 Remedial Investigation – Crispin Wanyoike, Earth Tech Inc.**

Background

Mr. Wanyoike stated that Site 1 consists of approximately 740 acres, and is the location of the EOD Range which was used for training for over 40 years. The use of the site for training purposes was discontinued in 1999 as part of Station closure.

Mr. Wanyoike stated that Site 1 was identified as an IRP site early in the IR Program. However, it could not be investigated until the Station closed because the site was used for detonation of munitions and there is a possibility that UXO may be present. For this reason, it is necessary to estimate the risk from unsafe ordnance and explosives (OE), then develop response actions that are consistent with the anticipated reuse.

Mr. Wanyoike said that the field investigation of Site 1 will consist of an OE survey followed by a tiered investigation. Tier 1 will consist of grid sampling and groundwater sampling. Tier 2 will consist of an anomaly and hotspot investigation. Tier 3 will consist of further hot spot investigation, as appropriate. Sample analysis will be conducted for VOCs, SVOCs, explosives, minerals, and perchlorates in groundwater. There will also be lots of trenching performed at the site. Soil will be investigated down to 10 to 15 feet. If contamination is found, the investigators will drill lower, if necessary, as far down as the groundwater table.

Mr. Wanyoike stated that the Draft RI Work Plan for Site 1 was issued in September 2000. A Draft OE Range Evaluation Work Plan that assessed the explosive potential at the site and how to address these concerns was issued in March 2001. The Draft OE Range Evaluation Work Plan included a proposal to blow up in place any OE that was unsafe to move. The regulatory agencies did not agree with this approach. Instead the regulators wanted to have the Navy develop alternative strategies for the ordnance and explosives that are unsafe to move, and allow public input into these decisions. The Final RI Work Plan for Site 1, which will incorporate regulatory agency suggestions, is scheduled to be issued in August 2001. The Draft Final OE Range Evaluation Work Plan will also be issued in August 2001. A 30-day public comment period will follow. Then the Final OE Range Evaluation Work Plan will be completed in November 2001. The field investigation of Site 1 will follow and is scheduled to take place from November 2001 to January 2002. The Draft RI report is scheduled to be issued in December 2002. The RI will summarize the Tier 1, 2 and 3 environmental and OE investigation results.

Discussion

Mr. Meier asked if some of the areas will be dug up? Mr. Wanyoike responded yes, that trenching will be performed in the areas where anomalies are reported. He also noted that Greg Peterson, a UXO-certified technician, who has previously made a RAB meeting presentation on how ordnance is to be handled, will oversee the use of the backhoe for digging up anomalies and trenching at Site 1.

Mr. Zwiefel asked whether the Navy was actually looking for live rounds? What do they expect to find? Mr. Wanyoike said that the range was used to detonate OE so the potential for finding live rounds is relatively low. The Navy expects to find material that has been exploded already, but will dig through the soil and determine what is present at the site.

Open Question and Answer Session

Mr. Ted Simon, RAB attendee, applauded the statement that no matter what the reuse of the Station is the water will be cleaned up. He asked, if the ultimate use is open land will the DON just leave the Station "as is?" Mr. Gould assured Mr. Simon that if there were greater awareness of what has been accomplished and what the Navy is trying to achieve, the public would feel very comfortable. He suggested that Mr. Simon review the summary introduction section of the MCAS El Toro Business Plan that is available on the information table. The full document, which is issued annually in March or April, covers the calendar year 2000 and explains what has been accomplished to date and the current stage of these activities in regard to environmental restoration at the Station. The DON is required to the extent reasonably practicable to attempt to clean up various sites consistent with the approved reuse plan. If the reuse plan changes, this would need to be looked at again.

Mr. Gould said that on page 2 of the MCAS El Toro Business Plan, 87% of the land at the Station is categorized as area types 1 through 4, which are environmentally ready for transfer. Area types 1 through 4 represent varying environmental conditions ranging from areas where contamination was never found, to areas where contamination was present and has been remediated. Institutional controls (future land use restrictions and provisions for access for potential future monitoring and maintenance activities) are only expected on seven Installation Restoration Program sites - Sites 2, 3, 5, 16, 17, 18, and 24. He said that Site 1, the EOD range, is still in the investigation stage, so there is no way to determine at this time what the institutional controls will be for this site. In November 2000, the DON responded in detail to the City of Irvine's request for information on institutional controls, and noted every site that was expected to have restrictions.

Mr. Gould also mentioned the Base Reuse Implementation Manual, which is one of the guidance documents for the Navy. This document is available online, and he urged attendees to review this manual. Towards the back of the manual, there is language on the "comeback policy" that documents the Navy's responsibilities, and what the Navy has to consider regarding the reuse plan.

◆ Open Question and Answer Session

MEETING EVALUATION AND FUTURE TOPICS

Meeting evaluation by RAB members:

- Limiting Questions and Answers until the end.

Suggestions for future presentation topics include:

- IDP update
- Report on Tank 651 (gas station) at the Exchange
- Tank Farm 555 update
- EOD Site 1 update
- Annual Groundwater Monitoring Program. Follow up with results at later meeting.
- HRA Update (Building 296)

CLOSING ANNOUNCEMENTS/FUTURE MEETING DATES

Upcoming RAB Meeting and Public Meeting

The next RAB meeting will be held on September 19, 2001 in the regular meeting location – Irvine City Hall, Conference and Training Center (CTC), One Civic Center Plaza, Irvine.

Recent RAB Subcommittee Meetings

- Wednesday, 5/30/01, at Room L-104, Irvine City Hall, before the RAB meeting.

The RAB Subcommittee has regularly scheduled meetings at the Irvine City Hall every other month at 5:00 p.m. on the same day as the RAB meeting in Room L-104. Additional meetings are also held, on an as needed basis, at other locations at the Irvine City Hall.

The 52nd meeting of the MCAS El Toro Restoration Advisory Board was adjourned at 9:20 p.m.

Attachments:

- Sign-in sheets from 7/25/01 RAB meeting.

Handouts provided at the meeting:

- RAB Meeting Agenda/Public Notice – 7/25/01 RAB meeting.
- Meeting Minutes from the May 30, 2001 RAB Meeting – 51st RAB.
- MCAS El Toro RAB Meeting Schedule, Full RAB and RAB Subcommittee (Sept. 2001 – July 2002).
- MCAS El Toro RAB Mission Statement and Operating Procedures.
- RAB Membership Application – MCAS El Toro RAB.
- MCAS El Toro Installation Restoration Program – Mailing List Coupon.
- MCAS El Toro Administrative Record File - Information Sheet (for on-Station access).
- MCAS El Toro Information Repository - Information Sheet.
- MCAS El Toro Where To Get More Information Sheet.
- Internet Access – Environmental Web Sites.
- MCAS El Toro Marine Corps/Navy RAB Co-Chair (address, telephone, fax, e-mail).
- MCAS El Toro - For More Information on Redevelopment.
- MCAS El Toro RAB Acronyms and Glossary of Technical Terms.
- MCAS El Toro RAB Upcoming Major Documents (July 2001).
- MCAS El Toro Base Realignment and Closure Business Plan, Introduction Section, March 2001.
- MCAS El Toro Environmental Compliance Program Documentation Update (July 2001).
- *Presentation* – Supplemental Radionuclide Evaluation Update, MCAS El Toro Restoration Advisory Board Meeting, July 25, 2001, Presented by Crispin Wanyoike, Earth Tech Inc.
- *Presentation* – Status of Radiological Surveys, MCAS El Toro Restoration Advisory Board Meeting, July 25, 2001, Presented by Bruce Christensen, Roy F. Weston, Inc.
- *Presentation* – Status Update IRP Site 1 Remedial Investigation, MCAS El Toro Restoration Advisory Board Meeting, July 25, 2001, Presented by Crispin Wanyoike, Earth Tech Inc.
- *Presentation* – Irvine Desalter Project (IDP)/Groundwater Quality Restoration Program, MCAS El Toro Restoration Advisory Board Meeting, July 25, 2001, Presented by Richard Bell, Irvine Ranch Water District.

RAB Subcommittee Handouts and Letters

- MCAS El Toro Subcommittee Meeting Minutes – 3/21/01 meeting (included with July 25, 2001 RAB meeting mailer; attachment to RAB Meeting Agenda/Public Notice and Meeting Minutes 5/30/01 RAB meeting).

Agency Comments and Letters - U.S. Environmental Protection Agency (U.S. EPA)

- No U.S. EPA handouts were provided at the 7/25/01 RAB meeting.

Agency Comments and Letters – California Environmental Protection Agency (Cal-EPA)

- Cal-EPA, DTSC – Draft Work Plan, Preliminary Assessment, Building 307, MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro; From: Triss M. Chesney, Remedial Project Manager, DTSC (letter dated July 2, 2001).
- Cal-EPA, Department of Toxic Substances Control (DTSC) – Draft Technical Memorandum, Replacement Well Installation and Groundwater Evaluation, MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro; From: Triss M. Chesney, Remedial Project Manager, DTSC (letter dated July 10, 2001).

Agency Comments and Letters – California Regional Water Quality Control Board (RWQCB)

- California Regional Water Quality Control Board (RWQCB), Santa Ana Region – Declaration for the Draft Final Record of Decision, Operable Unit 3B, IRP Sites 7 and 14, Former MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated June 28, 2001).
- RWQCB, Santa Ana Region – Comments on Draft Work Plan, Preliminary Assessment Building 307, MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated July 18, 2001).
- RWQCB, Santa Ana Region – Comments on Unexploded Ordnance (UXO) Surface Sweep Work Package, EOD Range (Site 1), MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated July 19, 2001).

Copies of all past RAB meeting minutes and handouts are available at the MCAS El Toro Information Repository, located at the Heritage Park Regional Library in Irvine. The address is 14361 Yale Avenue, Irvine; the telephone number is (949) 551-7151. Library hours are Monday through Thursday, 10 am to 9 p.m.; Friday and Saturday, 10 am to 5 p.m.; Sunday 12 p.m. to 5 p.m. [See next page for Internet sites.]

Internet Sites

Navy and Marine Corps Internet Access – Naval Facilities Engineering Command, Southwest Division, Environmental Web Sites (includes RAB meeting minutes)

www.efdswnavfac.navy.mil/environmental/evnhome.htm

Department of Defense – Environmental Cleanup Home Page Web Site

<http://www.dtic.mil/envirodod/index.html>

Department of Defense - Environmental BRAC Web Site

www.dtic.mil/envirodod/brac/

Defense Environmental Response Task Force Web Page

www.dtic.mil/envirodod/brac/dertf.html

Department of Defense- Community Involvement RAB Web Site

www.dtic/envirodod/rab/

U.S. EPA Superfund Web Page

www.epa.gov/superfund/index.html

MCAS EL TORO

RESTORATION ADVISORY BOARD MEETING

July 25, 2001

RAB MEMBER SIGN-IN SHEET

Name	Signature	Name	Signature
Bell, Richard	<i>Richard Bell</i>	Moutoux, Nicole	⊛
Britton, George		Marquis, Roland	
Chesney, Triss	<i>Triss M. Chesney</i>	Marquis, Suzanne	
Crompton, Chris		Matheis, Mary Aileen	
Farber, Dr. Joseph		Mathews, Thomas	
Gould, Dean – Co-Chair	<i>PRESENT - DID NOT SIGN IN</i>	Meier, Fred J.	<i>Fred J. Meier</i>
Hannon, Patricia	<i>Patricia Hannon</i>	Olquin, Richard	
Herndon, Roy	<i>Roy Herndon</i>	Reavis, Gail	⊛
Hersh, Peter	<i>Peter Hersh</i>	Rudolph, Marcia	⊛
Hurley, Greg – Co-Chair	⊛	Sharp, Steven	<i>Steve Sharp</i>
James, Novel	<i>Novel James</i>	Werner, Jerry	<i>Jerry Werner</i>
Jung, Dan	<i>Dan Jung</i>	Woodings, Bob	⊛
		Zweifel, Donald E.	<i>Don Zweifel</i>

⊛ = Excused Absence

CONFIDENTIAL RECORD

PORTIONS OF THIS RECORD ARE CONSIDERED
CONFIDENTIAL AND ARE NOT FOR PUBLIC VIEWING

PRIVATE CITIZENS' HOME ADDRESSES
HAVE BEEN REDACTED IN
ACCORDANCE WITH THE PRIVACY ACT

QUESTIONS MAY BE DIRECTED TO:

**DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132**

TELEPHONE: (619) 532-3676

New Attendees
will be added
to the MCAS
El Toro
Mailing List.

MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING

July 25, 2001

NON-RAB MEMBER SIGN-IN SHEET

Other Attendees, Guests

NAME <u>PLEASE PRINT CLEARLY</u>	AFFILIATION	COMPLETE MAILING ADDRESS [STREET NUMBER, STREET NAME, CITY, STATE, ZIP CODE]	PHONE FAX	INTERESTED IN RAB MEMBERSHIP?
Dhananjay Rawal	IT Corporation	3347 Michelson Drive #200 IRVINE CA 92612	949-660-7576 949-474-8309	NO
Bruce Christensen	Roy F. Weston, Inc	388 Seawind Dr. Vallejo, CA 94590	707-643-5425 (H) 707-562-3460 (B)	NO
Crispin Wanyorke	Earth Tech	100 W BROADWAY Suite 240 LONG BEACH CA 90802	4 562 951 2057	NO
Kim Foreman	DTSC	Cypress	(714) 484-5324	
Marc P. Smits	Navy SWDIV		619/532-0793	
TED SIMON	CITY OF LAKE FOREST	23161 LAKE CENTER DR LAKE FOREST, CA 92630	949 461 3488 949 461 3512	

CONFIDENTIAL

MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING

July 25, 2001

NON-RAB MEMBER SIGN-IN SHEET

Other Attendees, Guests

New Attendees
will be added
to the MCAS
El Toro
Mailing List.

NAME <u>PLEASE PRINT CLEARLY</u>	AFFILIATION	COMPLETE MAILING ADDRESS [STREET NUMBER, STREET NAME, CITY, STATE, ZIP CODE]	PHONE FAX	INTERESTED IN RAB MEMBERSHIP?
TERRY KIRCHGESSNER	NIVA	3486 Eboe ST IRVINE CA 92606	949 552-3548	NO
RICH TAMBARA	SCADMO	21865 E. COLEY DR. DIAMOND BAR CA 91765	909 396-2319	N/O
Vicki Cooper	U.S. EPA	75 Hawthorne St San Francisco CA	415 744-2188 FAX 415 744-1796	
Tim Burton	US Marine Corps	MCAS El Toro	726-4047	
Ellen Ann Kaylin	Resident (Irvine)			3 Need info

m:/rabmisc/gensign.doc

PLEASE PRINT CLEARLY AND PROVIDE COMPLETE INFORMATION

CONFIDENTIAL

New Attendees
will be added
to the MCAS
El Toro
Mailing List.

MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
July 25, 2001

NON-RAB MEMBER SIGN-IN SHEET
Other Attendees, Guests

NAME <u>PLEASE PRINT CLEARLY</u>	AFFILIATION	<u>COMPLETE MAILING ADDRESS</u> [STREET NUMBER, STREET NAME, CITY, STATE, ZIP CODE]	PHONE FAX	INTERESTED IN RAB MEMBERSHIP?
Patricia Haworth	US Navy	HC 75 Box 17970 Cobbs Creek, VA 23035	757-887-4692	No
John Harris	City of Irvine	P.O. Box 19575 Irvine, CA 92623-9575 % City Manager's Office	949 724-7508	
Polin Modanlou	LRA	—	949-262-0423	No
Marge Flesch	NAVY/MC.			
Tom O'Malley	STRPA		949-724 6393	
DON WHITTAKER	SWDIV		619-532-0791	

MCAS El Toro -- Meeting Schedule
Restoration Advisory Board (RAB)
Full RAB and RAB Subcommittee Meetings

September 2001 – July 2002

RAB Meetings: The Conference and Training Center (CTC) at Irvine City Hall is being reserved for RAB meetings (full RAB) on the last Wednesday of the month, dates are listed below. **Time: 6:30 – 9:00 p.m.**

* Please note that due to the Yom Kippur holiday (begins on Sept. 26th at sundown), the September 2002 RAB meeting and Subcommittee will be on September 19th.

RAB Subcommittee Meetings: Subcommittee meetings will now be on the *SAME DAY* as the full RAB meeting from 5 to 6:00 p.m. in a smaller room. The preferred room is by the Council Chambers, Room L-104. **General Meeting Time: 5:00 – 6:00 p.m. (Room is available from 4:30 to 6:30 p.m.)**

RAB and Subcommittee Meeting Dates	RAB Meeting Room – Conference and Training Center (CTC) 6:30 – 9:00 p.m.	Subcommittee Meeting Room – Room L-104 5:00 – 6:00 p.m.
September 19, 2001	CTC	Room L-104
November 28, 2001	CTC	Room L-104
January 30, 2002	CTC	Room L-104
March 27, 2002	CTC	Room L-104
May 29, 2002	CTC	Room L-104
July 31, 2002	CTC	Room L-104

MARINE CORPS AIR STATION EL TORO
Installation Restoration Program
Restoration Advisory Board Mission Statement and Operating Procedures

This "Marine Corps Air Station (MCAS) El Toro, Installation Restoration Program, Restoration Advisory Board (RAB), Mission Statement and Operating Procedures," replaces the Revised Version dated January 31, 1996. This revised document contains a new section on the RAB Subcommittee, which replaces the old section. The new section is based on modifications made and approved by a majority vote of the RAB members present at the April 21, 1999 RAB meeting with further refinements made at the May 26, 1999 RAB meeting. Modifications incorporated resulted in revising the subcommittee structure so there is now only one RAB subcommittee. (Note: the original Mission Statement document was dated and signed on February 28, 1995.)

The Restoration Advisory Board (RAB) mission statement and operating procedures, herein referred to as "the mission statement and operating procedures", is entered into by the following parties; U. S. Marine Corps (USMC); U. S. Environmental Protection Agency (USEPA), Region 9; California Department of Toxic Substances Control (DTSC), Region 4; and the RAB. Marine Corps Air Station (MCAS) El Toro has developed a Community Relations Plan (CRP) which outlines the community involvement program. The RAB supplements the community involvement effort. A copy of the CPP is available at the information repository located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, CA 92714.

I. Mission Statement of the RAB

a. The mission of the RAB is to promote community awareness and obtain timely constructive community review and comment on proposed environmental restoration actions to accelerate the cleanup and property transfer of MCAS El Toro. The RAB serves as a forum for the presentation of comments and recommendations to USMC, Remedial Project Managers (RPMS) of USEPA, and DTSC.

II. Basis and Authority for this Mission Statement and Operating Procedures

a. This mission statement and these operating procedures are consistent with the Department of Defense (DoD), USEPA Restoration Advisory Board Implementation Guidelines of September 27, 1994, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendment and Reauthorization Act (SARA) of 1986, particularly Sections 120 (a), 120 (f), 121 (f), and 10 U.S.C. 2705, enacted by Section 211 of SARA, and September 9, 1993, DoD policy letter entitled, "Fast Track Cleanup at Closing Installations".

III. Operating Procedures

A. Membership

1. All RAB members must reside in or serve communities within Orange County.
2. Members shall serve without compensation. All expenses incidental to travel and review inputs shall be borne by the respective members or their organization.
3. If a member fails to attend two consecutive meetings without contacting the RAB, or at least one of the RAB co-chairs, or fulfill member responsibilities including involvement in a subcommittee, the RAB co-chairs may ask the member to resign.
4. Members unable to continue to fully participate shall submit their resignation in writing to either of the RAB co-chairs.
5. Total membership in the RAB shall not exceed 50 members.
6. Applications for RAB membership vacancies shall take place as such vacancies occur. Applications will be reviewed and approved by the Base Realignment and Closure (BRAC), Environmental Coordinator (BEC), USEPA, and DTSC along with consultation with the RAB community co-chair. Candidates will be notified of their selection in a timely manner.
7. Each RAB community member is considered equal whatever their position in the community, and has equal rights and responsibilities.

RAB Membership Responsibilities

- a. Actively participate in a subcommittee and review, evaluate, and comment on technical documents and other material related to installation cleanup, all assigned tasks are to be completed within the designated deadline date.
- b. Attend all RAB meetings.
- c. Report to organized groups to which they may belong or represent, and to serve as a mediator for information to and from the community.
- d. Serve in a voluntary capacity.

B. RAB Structure

1. The RAB shall be co-chaired by the MCAS El Toro BEC, and a community co-chair member. The BEC shall preside over the orderly administration of membership business.

2. A community co-chair will be selected by a majority vote of the RAB community members in attendance. Elected officials and government agency staff members of any legally constituted MCAS El Toro reuse groups are excluded from holding the community co-chair position. The community co-chair will be selected annually on the anniversary of the effective date of the agreement.

Community Co-Chair Responsibilities

- a. Assure those community issues and concerns related to the environmental restoration/cleanup program are brought to the table.
 - b. Assist the USMC in assuring that technical information is communicated in understandable terms.
 - c. Coordinate with the BEC to prepare and distribute an agenda prior to each RAB meeting, and for the review and distribution of meeting minutes.
 - d. Assist subcommittees in coordinating and establishing meeting times/locations.
 - e. The community co-chair may be replaced by a majority vote of the RAB community members present at the meeting in which a vote is undertaken.
3. The RAB shall meet quarterly. More frequent meetings may be held if deemed necessary by the RAB co-chairs. The BEC will facilitate in the arrangement of the meetings and notify members of the time and location.
4. Agenda items will be compiled by the RAB co-chairs. Suggested topics should be given to the BEC or community co-chair no later than two (2) weeks prior to the meeting. The BEC shall be responsible for providing written notification to all RAB members of the upcoming agenda and supporting documents, at least two (2) weeks prior to the date, time, and place of scheduled RAB meeting.
5. The BEC shall be responsible for recording and distribution of meeting minutes. Also, the BEC shall collect a written list of attendees at each meeting, which will be incorporated into the meeting minutes. For quarterly meetings, the minutes will be distributed 30 days prior to the following meeting. For more frequent meetings, the minutes will be distributed as soon as possible.
6. A copy of the RAB meeting minutes will be sent to all RAB members. Supporting documents will be available for public review in the information repository and other repositories as identified.
7. RAB members will be asked to review and comment on various environmental restoration documents. Written comments may be submitted individually by a member, or by the RAB as a whole. Written comments will be submitted to the community co-chair on the subject documents within the schedule as provided for regulatory agency comments. The community

co-chair will consolidate comments from RAB members and provide all comments received to the BEC. The BEC will ensure that a written response is provided to the RAB in a timely manner.

RAB Subcommittee

8. On April 21, 1999, the RAB concurred that only one subcommittee is necessary to provide a concentrated focus on environmental cleanup issues. Therefore, the existing relevant subcommittees envisioned in the original "Mission Statement and Operating Procedures" dated February 28, 1995, have been dissolved, and incorporated into one subcommittee.

a. Membership on the subcommittee will be comprised of volunteers from the RAB, or may be selected by the BEC and the community co-chair.

b. The regular bimonthly RAB subcommittee meeting will continue to be scheduled for the last Wednesday of the month alternating with the regular meeting of the full RAB held at Irvine City Hall, Conference and Training Center, Irvine, California.

c. The subcommittee will set their own agendas and meetings and will be open to the public. The subcommittee chair will notify the BEC and community co-chair of all meeting times and places including additional subcommittee meetings other than the regularly scheduled bimonthly subcommittee meeting.

d. The subcommittee will elect a chair. The subcommittee membership may dismiss a subcommittee chair by a majority vote. Subcommittee chair removal is determined at the meeting where removal is addressed by majority vote of the RAB members present.

e. Membership on the subcommittee will include the RAB community co-chair.

f. Subcommittee status will be reviewed annually, in May, to determine if changes are needed or the continued existence is required.

g. The RAB subcommittee may establish ad hoc subcommittees for specific issues and purposes that would focus efforts on a short-term basis.

h. The subcommittee may request the participation, involvement, and advice of regulatory agency members.

9. MCAS El Toro has established an information repository for public documents relating to restoration activities at MCAS El Toro. The repository is located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, CA 92714. RAB members, as well as the general public, are authorized access to any documents, studies or information, which have been placed in the repository or distributed at RAB meetings. The community co-chair will be provided one (1) copy of all draft documents. The subcommittee will be provided up to seven (7) copies of draft documents.

IV. Effective Date and Amendments

a. The effective date of this mission statement and operating procedures shall be the date that the last signatory signs this mission statement and operating procedures.

b. This mission statement and operating procedures may be amended by a majority vote of the RAB members present. Amendments must be consistent with the MCAS El Toro Federal Facility Agreement (FFA), and the statutes stated in Part 11 of the mission statement and operating procedures, (Basis and Authority for this Mission Statement and Operating Procedures).

V. Terms and Conditions

a. The terms and conditions of this RAB mission statement and operating procedures, and DONs endorsement thereof, shall not be construed to create any legally enforceable rights, claims or remedies against DON or commitments or obligations on the part of DON, and shall be construed in a manner that is consistent with CERCLA, 10 U.S.C. Section 2705, and 40 CFR Part 300.

VI. Termination

a. This mission statement and operating procedures will be terminated upon completion of requirements as stated in the FFA. However, after implementation of the final remedial design, it may be terminated earlier upon a majority vote of the RAB membership.

VII. Signatories to the Membership Mission Statement and Operating Procedures

IN WITNESS WHEREOF, we have set our hand this _____ day of _____ 1995.

MCAS El Toro BRAC Environmental Coordinator

RAB Community Co-Chair

U. S. Environmental Protection Agency RPM

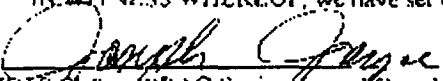
California Department of Toxic Substances Control RPM

The original "Mission Statement and Operating Procedures", dated February 28, 1995, is on file at Marine Corps Air Station (MCAS) El Toro, Environment and Safety. It was signed by Mr. Joseph Joyce, Base Realignment and Closure (BRAC), Environmental Coordinator (BEC), Ms. Marcia Rudolph, Restoration Advisory Board (RAB), Community Co-chair, Ms. Bonnie Arthur, Environmental Protection Agency (EPA), Remedial Project Manager, and Mr. Juan Jimenez, Department of Toxic Substances Control (DTSC), Remedial Project Manager.


Shown below is an excerpt from the original "Mission Statement and Operating Procedures", dated February 28, 1995 with signatures of the above-mentioned individuals.

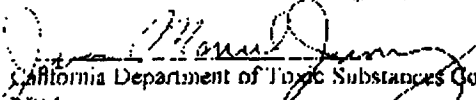
VII. Signatories to the Membership Mission Statement and Operating Procedures

IN WITNESS WHEREOF, we have set our hand this 28th day of FEBRUARY, 1995


MCAS El Toro BRAC Environmental Coordinator


RAB Community Co-Chair


U.S. Environmental Protection Agency RPM


California Department of Toxic Substances Control
RPM

MEMBERSHIP APPLICATION

MARINE CORPS AIR STATION EL TORO RESTORATION ADVISORY BOARD

Conditions for membership:

Restoration Advisory Board (RAB) members are expected to serve a two-year term and attend all RAB meetings or designate an alternate. The alternate must be jointly approved by the Department of Defense and Community Co-Chairpersons. If a member fails to attend two consecutive meetings without contacting the RAB, or at least one of the RAB Co-Chairs, or fulfill member responsibilities, which may include involvement with the subcommittee, the RAB Co-Chairs may ask the member to resign. Duties and responsibilities will include reviewing and commenting on technical documents and activities associated with the environmental restoration at **MARINE CORPS AIR STATION EL TORO**. Members will be expected to be available to community members and groups to facilitate the exchange of information and/or concerns between the community and the RAB.

RAB membership priority will be given to local residents that are impacted/affected by the closure of the installation. The number of RAB members is limited.

Name: _____

Address: _____
 Street Suite/Apt. # City Zip

Phone: () _____ () _____ () _____
 Daytime Home Fax

Group Affiliation: _____

1. Briefly state why you would like to be considered for membership on the Restoration Advisory Board (RAB).

(continued on back side)

2. What has been your experience working as a member of a diverse group with common goals?

- 3 Please indicate if you are interested in being considered for the Community Co-Chairperson position on the RAB by checking the space below:

Yes, I would like to be considered. ____

4. Are you willing to serve a two (2) year term as a member of this RAB?

Yes, I am willing- to serve for two (2) years. ____

5. By submitting this signed application, you are aware of the time commitment that this appointment will require of you.
6. By submitting this signed application, you willingly agree to work cooperatively with other members of the committee to ensure efficient use of time for addressing community issues related to environmental restoration of the Station.

Applicant Signature

Date

Please return your completed application to:

Dean Gould
BRAC Environmental Coordinator
Base Realignment and Closure, Environmental Division
P.O. Box 51718
Irvine, CA 92619-1718

(949) 726-5398
FAX (949) 726-6586

San Diego office: (619) 532-0784

MCAS El Toro

Installation Restoration Program

MAILING LIST COUPON

If you would like to be on the mailing list to receive information about environmental restoration activities at MCAS El Toro, please complete the coupon below and mail to:

Base Realignment and Closure
Attn: Environmental, Ms. Marge Flesch
P.O. Box 51718
Irvine, CA 92619-1718

- ☐ Add me to the MCAS El Toro Installation Restoration Program mailing list.
- ☐ Send me information on Restoration Advisory Board membership.

Name _____

Street _____

City _____ State _____ Zip Code _____

Affiliation (optional) _____ Telephone _____

Administrative Record File

- Located at MCAS El Toro – BRAC Office, Marine Way, Building 368, 2nd floor
- Anyone is welcome to review documents in the file
- To view the documents, schedule an appointment by calling:
 - Mr. Dean Gould at (949) 726-5398 or (619) 532-0784
 - Ms. Ms. Marge Flesch at (949) 726-5398

*See the backside for location of the
Information Repository*

Information Repository

- Located at Heritage Park Regional Library in Irvine
- Address: 14361 Yale Avenue, Irvine
- Hours: Monday-Thursday, 10 am to 9 pm
Friday and Saturday, 10 am to 5 pm
Sunday 12 pm to 5 pm
- Phone: (949) 551-7151
- Contains key Installation Restoration Program documents and complete materials from all RAB meetings (agendas, minutes, handouts)
- Anyone is welcome to review documents at the Library

Where To Get More Information:

Copies of Remedial Investigation reports, other key documents, and additional information relating to environmental cleanup activities at MCAS El Toro are available for public review at the following information repository:

Heritage Park Regional Library
14361 Yale Avenue
Irvine, CA
(949) 551-7151

Current hours:
Monday-Thursday 10am-9pm
Friday-Saturday 10am-5pm
Sunday 12pm-5pm

Key Project Representatives:

Mr. Dean Gould*
BRAC Environmental Coordinator
Base Realignment and Closure,
Environmental Division
MCAS El Toro
P.O. Box 51718
Irvine, CA 92619-1718
(949) 726-5398 or (619) 532-0784

Ms. Nicole Moutoux*
Project Manager
U.S. EPA Region IX
75 Hawthorne St. (SFD-H-8)
San Francisco, CA 94105
(415) 744-2366

Ms. Triss Chesney*
Project Manager
Cal-EPA, Department of Toxic
Substances Control
5796 Corporate Avenue
Cypress, CA 90630
(714) 484-5395

Ms. Patricia Hannon*
Project Manager
Cal-EPA, Regional Water Quality
Control Board
3737 Main Street, Suite 500
Riverside, CA 92501-3339
(909) 782-4498

* BRAC Cleanup Team (BCT) Member

Ms. Viola Cooper Community Involvement Coordinator Superfund Division 75 Hawthorne Street (SFD-3) San Francisco, CA 94105 U.S. EPA, Region IX (415) 744-2188 (800) 231-3075	Ms. Kim Foreman Public Participation Specialist Cal-EPA, Department of Toxic Substances Control 5796 Corporate Avenue Cypress, CA 90630 (714) 484-5324
---	---

Navy and Marine Corps - Internet Access Environmental Web Sites

**N
E
W**

Southwest Division Naval Facilities Engineering Command Web Site:

<http://www.efdsw.navfac.navy.mil.environmental/envhome.htm>

Department of Defense - Environmental Web Page

<http://www.dtic.mil/environdod/>

Department of Defense - Environmental BRAC Web Page

<http://www.dtic.mil/environdod/envbrac.html>

U.S. EPA Superfund Web Page

www.epa.gov/superfund/index.html

Marine Corps/Navy RAB Co-Chair

Dean Gould

BRAC Environmental Coordinator

Base Realignment and Closure, Environmental Division

P.O. Box 51718

Irvine, CA 92619-1718

(949) 726-5398

FAX (949) 726-6586

E-mail: goulddda@efdswnavfac.navy.mil

San Diego phone and fax:

(619) 532-0784

FAX (619) 532-0780

For More Information on
MCAS El Toro Redevelopment

Mr. Gary Simon
Executive Director

MCAS El Toro
Local Redevelopment Authority
(714) 834-3000

MCAS El Toro

Restoration Advisory Board

Acronyms and Glossary of Technical Terms

This handout has been prepared to provide Restoration Advisory Board (RAB) members and others with a better understanding of acronyms and technical terms used during Installation Restoration Program activities and other environmental programs underway at MCAS El Toro.

List of Acronyms

AB	Assembly Bill
accumulation areas	less-than-90-day accumulation areas
ACM	asbestos-containing materials
AC/S	Assistant Chief of Staff
AFB	Air Force Base
AOC	area of concern
AQMP	Air Quality Management Plan
AR	Administrative Record
ARAR	applicable or relevant and appropriate requirement
ASN	Assistant Secretary of the Navy
AST	aboveground storage tank
Basin	the Los Angeles Basin
BCP	BRAC Cleanup Plan
BCT	BRAC Cleanup Team
BEC	BRAC Environmental Coordinator
BFI	Browning Ferris Industries
bgs	below ground surface
BNI	Bechtel National, Inc.
BRAC	Base Realignment and Closure
BRAC III	Base Closure and Realignment Act of 1993
CAC	Citizens Advisory Committee
Cal-EPA	California Environmental Protection Agency
CBCEC	California Base Closure Environmental Committee
CCR	<i>California Code of Regulations</i>
CDM Federal	CDM Federal Programs Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CFR	<i>Code of Federal Regulations</i>
CLEAN	Comprehensive Long-Term Environmental Action Navy
CMC	Commandant of the Marine Corps
COE	(United States) Army Corps of Engineers
COMCABWEST	Commander, Marine Corps Air Bases Western Area
COPC	chemical of potential concern
County	Orange County
CP	Compliance Program
CRP	Community Reuse Plan
CTO	Contract Task Order

List of Acronyms

D&M	Dames & Moore
DFSC	Defense Fuel Supply Center
the Districts	the County Sanitation Districts of Orange County
DoD	Department of Defense
DOI	Department of Interior
DoN	Department of the Navy
DRMO	Defense Reutilization and Marketing Office
DTSC	(Cal-EPA) Department of Toxic Substances Control
EBS	Environmental Baseline Survey
ECP	environmental condition of property
EE/CA	Engineering Evaluation/Cost Analysis
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Environmental Office
EOD	explosive ordnance disposal
ETRPA	El Toro Reuse Planning Authority
°F	degrees Fahrenheit
FA	further action
FAA	Federal Aviation Administration
FDS	Federal Disposal Services
FFA	Federal Facility Agreement
FOSL	finding of suitability to lease
FOST	finding of suitability to transfer
FS	feasibility study
ft/day	feet per day
gal.	gallon
GIS	geographical information system
HAS	Homeless Assistance Submission
HRA	Historical Radiological Assessment
HUD	(United States Department of) Housing and Urban Development
IAFS	Interim Action Feasibility Study
IDW	investigation-derived waste
IRP	Installation Restoration Program
IRWD	Irvine Regional Water District
IT	International Technology Corporation
IWTP	industrial wastewater treatment plant
JMM	James M. Montgomery Engineers

List of Acronyms

LBP	lead-based paint
LDPE	low density polyethylene
LOC	location of concern
LRA	Local Redevelopment Authority
MAW	marine air wing
MCAS	Marine Corps Air Station
MCL	maximum contaminant level
mg/L	milligrams per liter
MSL	mean sea level
NAVFAC	Naval Facilities
NAVFACENGCOM	Naval Facilities Engineering Command
NAVRAMP	Navy Radon Assessment and Mitigation Program
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEDTS	Navy Environmental Data Transfer Standards
NFA	no further action
NEPA	National Environmental Policy Act
NFI	no further investigation
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
OCHCA	Orange County Health Care Agency
OCWD	Orange County Water District
OEA	Office of Economic Adjustment
OHM	OHM Remediation Services Corporation
OSHA	Occupational Safety and Health Administration
OU	operable unit
OWS	oil/water separator
PAH	polynuclear aromatic hydrocarbon
PBR	Permit by Rule
PCB	polychlorinated biphenyl
pCi/L	picocuries per liter
PP	Proposed Plan
ppm	parts per million
PRG	preliminary remediation goal
Project Team	BRAC Project Team
PWC	Navy Public Works Center
QAPP	quality assurance project plan

List of Acronyms

RAB	Restoration Advisory Board
RAC	remedial action contract
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RECLAIM	Regional Clean Air Initiatives Market
RFA	RCRA Facility Assessment
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
RWQCB	Regional Water Quality Control Board
SAIC	Science Applications International Corporation
SCAQMD	South Coast Air Quality Management District
SPCC	Spill Prevention and Countermeasure Plan
Station	Marine Corps Air Station El Toro
STP	sewage treatment plant
SVE	soil vapor extraction
SVOC	semivolatile organic compound
SWDIV	Southwest Division Naval Facilities Engineering Command
SWMU	solid waste management unit
TAA	temporary accumulation area
TCRA	time-critical removal action
TDS	total dissolved solids
TRC	Technical Review Committee
TSCA	Toxic Substances Control Act
UCL	upper confidence limit
U.S. EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USMC	United States Marine Corps
UST	underground storage tank
VOC	volatile organic compound
WW	World War
XFMR	transformer

ACRONYMS/ABBREVIATIONS

Air SWAT	Air Quality Solid Waste Assessment Test
ASTM	American Society for Testing and Materials
BCT	BRAC Cleanup Team
BEIDMS	Bechtel Environmental Integrated Data Management System
bgs	below ground surface
BNI	Bechtel National, Inc.
BRAC	Base Realignment and Closure
°C	degrees Celsius
Cal/EPA	California Environmental Protection Agency
CARB	California Air Resources Board
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	U.S. EPA Contract Laboratory Program
CNDDB	California Natural Diversity Data Base
COPC	chemical of potential concern
CPT	cone penetrometer test
CTO	Contract Task Order
DC	direct current
DCE	dichloroethene
Desalter	Irvine Desalter Project
DoD	Department of Defense
DON	Department of the Navy
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
EC	electrical conductivity
EOD	explosive ordnance disposal
°F	degrees Fahrenheit
FFA	Federal Facilities Agreement
FID	flame ionization detector
FS	Feasibility Study
FSP	Field Sampling Plan
ft/day	feet per day

ACRONYMS/ABBREVIATIONS (continued)

GC	gas chromatograph
gpm	gallons per minute
GPR	ground-penetrating radar
IAFS	Interim-Action Feasibility Study
IAS	Initial Assessment Study
ID	inside diameter
IDWMP	Investigation-Derived Waste Management Plan
IRP	Installation Restoration Program
L/min	liters per minute
µmhos/cm	micromhos per centimeter
MCAS	Marine Corps Air Station
MeCl	methylene chloride
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
MSL	mean sea level
NACIP	Navy Assessment and Control of Installation Pollutants
NEESA	Naval Energy and Environmental Support Activity
NFESC	Naval Facilities Engineering Service Center (formerly NEESA)
NFRAP	No Further Response Action Planned
NPL	National Priorities List
NTU	nephelometric turbidity units
OCWD	Orange County Water District
OD	outside diameter
OU	operable unit
PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
PRG	(U.S. EPA Region IX) Preliminary Remediation Goal
psi	per square inch
psig	per square inch gauge

ACRONYMS/ABBREVIATIONS (continued)

QA	quality assurance
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROICC	Resident Officer in Charge of Construction
RPD	relative percent difference
RWQCB	(California) Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SCAQMD	South Coast Air Quality Management District
SIPOA	Site Inspection Plan of Action
SOP	Standard Operating Procedure
SVE	soil vapor extraction
SVOC	semivolatile organic compound
SWDIV	Southwest Division Naval Facilities Engineering Command
SWMU/AOC	solid waste management unit/area of concern
TCA	trichloroethane
TCE	trichloroethylene
TDS	total dissolved solids
TIC	The Irvine Company
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
USCS	Unified Soils Classification System
U.S. EPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
VOA	volatile organic analysis
VOC	volatile organic compound
v/v	volume per volume
WSA	waste staging area

ACRONYMS/ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
BCT	BRAC Cleanup Team
bgs	below ground surface
BNI	Bechtel National, Inc.
BRAC	Base Realignment and Closure
°C	degrees Celsius
Cal-EPA	California Environmental Protection Agency
CCR	<i>California Code of Regulations</i>
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (1980)
cfm	cubic feet per minute
CFR	<i>Code of Federal Regulations</i>
CLEAN	Comprehensive Long-Term Environmental Action Navy
cm ³ /g	cubic centimeters per gram
cm/s	centimeters per second
CPT	cone penetrometer test
CTO	Contract Task Order
DCA	dichloroethane
DCE	dichloroethene
DNAPL	dense nonaqueous-phase liquid
DON	Department of the Navy
DTSC	(Cal-EPA) Department of Toxic Substances Control
DWR	(California) Department of Water Resources
°F	degrees Fahrenheit
FFA	Federal Facilities Agreement
FS	Feasibility Study
ft ³	cubic feet
ft/day	feet per day
ft ³ /min	cubic feet per minute
GAC	granular activated carbon
gpm	gallons per minute
HQ	hazard quotient
IAFS	Interim-Action Feasibility Study
ICE	internal combustion engine
IRP	Installation Restoration Program

ACRONYMS/ABBREVIATIONS (continued)

IRWD	Irvine Ranch Water District
Irvine Subbasin	Irvine Groundwater Subbasin
JMM	James M. Montgomery Engineers, Inc.
LGAC	liquid-phase granular activated carbon
LNAPL	light nonaqueous-phase liquid
MCAS	Marine Corps Air Station
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MSL	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NPL	National Priorities List
NPW	net present worth
OCWD	Orange County Water District
OU	operable unit
PCE	tetrachloroethene
PCO	photocatalytic oxidation
POTW	publicly owned treatment works
PVC	polyvinyl chloride
RACER	Remedial Action Cost Engineering Requirements
RAO	remedial action objective
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RWQCB	(California) Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act of 1986
SCAQMD	South Coast Air Quality Management District
SHSO	Site Health and Safety Officer
SITE	(U.S. EPA) Superfund Innovative Technologies Evaluation
STLC	soluble threshold limit concentration

ACRONYMS/ABBREVIATIONS (continued)

SVE	soil vapor extraction
SWDIV	Southwest Division Naval Facilities Engineering Command
SWRCB	(California) State Water Resources Control Board
TAL	target analyte list
TBC	to be considered
TCA	trichloroethane
TCE	trichloroethene
TCLP	toxicity characteristic leaching procedure
TDS	total dissolved solids
TPH	total petroleum hydrocarbons
USGS	United States Geological Survey
U.S. EPA	United States Environmental Protection Agency
UV	ultraviolet
VGAC	vapor-phase granulated activated carbon
VES	vapor extraction system
VOC	volatile organic compound
WQCP	(Comprehensive) Water Quality Control Plan (for the Santa Ana Region)



Terms Of Environment

Glossary, Abbreviations, And Acronyms



Introduction

Terms Of Environment defines in non-technical language the more commonly used environmental terms appearing in EPA publications, news releases, and other Agency documents available to the general public, students, the media, and Agency employees. The definitions do not constitute the Agency's official use of terms and phrases for regulatory purposes, and nothing in this document should be construed to alter or supplant any other federal document. Official terminology may be found in the laws and related regulations as published in such sources as the Congressional Record, Federal Register, and elsewhere.

The terms selected for inclusion are derived from previously published lists, internal glossaries produced by various programs and specific suggestions made by personnel in many Agency offices. The chemicals and pesticides selected for inclusion are limited to those most frequently referred to in Agency publications or that are the subject of major regulatory or program activities.

Definitions or information about substances or program activities not included herein may be found in EPA libraries or scientific/technical reference documents, or may be obtained from various program offices.

Those with suggestions for future editions should write to the Editorial Services Division, Office of Communications, Education, and Public Affairs, A-107, USEPA, Washington DC 20460.

Abbreviation and acronym list begins on page 31

A

A—Scale Sound Level: A measurement of sound approximating the sensitivity of the human ear, used to note the intensity or annoyance level of sounds.

Abandoned Well: A well whose use has been permanently discontinued or which is in a state of such disrepair that it cannot be used for its intended purpose.

Abatement: Reducing the degree or intensity of, or eliminating, pollution.

Accident Site: The location of an unexpected occurrence, failure or loss, either at a plant or along a transportation route, resulting in a release of hazardous materials.

Acclimatization: The physiological and behavioral adjustments of an organism to changes in its environment.

Acid Deposition: A complex chemical and atmospheric phenomenon that occurs when emissions of sulfur and nitrogen compounds and other substances are transformed by chemical processes in the atmosphere, often far from the original sources, and then deposited on earth in either wet or dry form. The wet forms, popularly called "acid rain," can fall as rain, snow, or fog. The dry forms are acidic gases or particulates.

Acid Rain: (See: acid deposition)

Action Levels: 1. Regulatory levels recommended by EPA for enforcement by FDA and USDA when pesticide residues occur in food or feed commodities for reasons other than the direct application of the pesticide. As opposed to "tolerances" which are established for residues occurring as a direct result of proper usage, action levels are set for inadvertent residues resulting from previous legal use or accidental contamination. 2. In the Superfund program, the existence of a contaminant concentration in the environment high enough to warrant action or trigger a response under SARA and the National Oil and Hazardous Substances Contingency Plan. The term is also used in other regulatory programs. (See: tolerances.)

Activated Carbon: A highly adsorbent form of carbon used to remove odors and toxic substances from liquid or gaseous emissions. In waste treatment it is used to remove dissolved organic matter from waste water. It is also used in motor vehicle evaporative control systems.

Activated Sludge: Product that results when primary effluent is mixed with bacteria-laden sludge and then agitated and aerated to promote biological treatment, speeding the breakdown of organic matter in raw sewage undergoing secondary waste treatment.

Activator: A chemical added to a pesticide to increase its activity.

Active Ingredient: In any pesticide product, the component that kills, or otherwise controls, target pests. Pesticides are regulated primarily on the basis of active ingredients.

Activity Plans: Written procedures in a school's asbestos management plan that detail the steps a Local Education Agency (LEA) will follow in performing the initial and additional cleaning, operation and maintenance-program tasks; periodic surveillance; and reinspections required by the Asbestos Hazard Emergency Response Act (AHERA).

Acute Exposure: A single exposure to a toxic substance which results in severe biological harm or death. Acute exposures are usually characterized as lasting no longer than a day, as compared to longer, continuing exposure over a period of time.

Acute Toxicity: The ability of a substance to cause poisonous effects resulting in severe biological harm or death soon after a single exposure or dose. Also, any severe poisonous effect resulting from a single short-term exposure to a toxic substance. (See: chronic toxicity, toxicity.)

Adaptation: Changes in an organism's structure or habits that help it adjust to its surroundings.

Add-on Control Device: An air pollution control device such as carbon absorber or incinerator that reduces the pollution in an exhaust gas. The control device usually does not affect the process being controlled and thus is "add-on" technology, as opposed to a scheme to control pollution through altering the basic process itself.

Adequately Wet: Asbestos containing material that is sufficiently mixed or penetrated with liquid to prevent the release of particulates.

Administrative Order On Consent: A legal agreement signed by EPA and an individual, business, or other entity through which the violator agrees to pay for correction of violations, take the required corrective or cleanup actions, or refrain from an activity. It describes the actions to be taken, may be subject to a comment period, applies to civil actions, and can be enforced in court.

Administrative Order: A legal document signed by EPA directing an individual, business, or other entity to take corrective action or refrain from an activity. It describes the violations and actions to be taken, and can be enforced in court. Such orders may be issued, for example, as a result of an administrative complaint whereby the respondent is ordered to pay a penalty for violations of a statute.

Administrative Procedures Act: A law that spells out procedures and requirements related to the promulgation of regulations.

Administrative Record: All documents which EPA considered or relied on in selecting the response action at a Superfund site, culminating in the record of decision for remedial action or, an action memorandum for removal actions.

Adsorption: An advanced method of treating waste in which activated carbon removes organic matter from wastewater.

Adulterants: Chemical impurities or substances that by law do not belong in a food, or pesticide.

Adulterated: 1. Any pesticide whose strength or purity falls below the quality stated on its label. 2. A food, feed, or product that contains illegal pesticide residues.

Advanced Treatment: A level of wastewater treatment more stringent than secondary treatment; requires an 85-percent reduction in conventional pollutant concentration or a significant reduction in non-conventional pollutants.

Advanced Wastewater Treatment: Any treatment of sewage that goes beyond the secondary or biological water treatment stage and includes the removal of nutrients such as phosphorus and nitrogen and a high percentage of suspended solids. (See primary, secondary treatment.)

Advisory: A non-regulatory document that communicates risk information to those who may have to make risk management decisions.

Aerated Lagoon: A holding and/or treatment pond that speeds up the natural process of biological decomposition of organic waste by stimulating the growth and activity of bacteria that degrade organic waste.

Aeration: A process which promotes biological degradation of organic matter in water. The process may be passive (as when waste is exposed to air), or active (as when a mixing or bubbling device introduces the air).

Aeration Tank: A chamber used to inject air into water.

Aerobic Treatment: Process by which microbes decompose complex organic compounds in the presence of oxygen and use the liberated energy for reproduction and growth. (Such processes include extended aeration, trickling filtration, and rotating biological contactors.)

Aerobic: Life or processes that require, or are not destroyed by, the presence of oxygen. (See: anaerobic.)

Aerosol: A suspension of liquid or solid particles in a gas.

Affected Public: The people who live and/or work near a hazardous waste site.

Afterburner: In incinerator technology, a burner located so that the combustion gases are made to pass through its flame in order to remove smoke and odors. It may be attached to or be separated from the incinerator proper.

Agent Orange: A toxic herbicide and defoliant used in the Vietnam conflict, containing 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) and 2,4-dichlorophenoxyacetic acid (2,4-D) with trace amounts of dioxin.

Agricultural Pollution: Farming wastes, including runoff and leaching of pesticides and fertilizers; erosion and dust from plowing; improper disposal of animal manure and carcasses; crop residues, and debris.

Agro-ecosystem: Land used for crops, pasture, and livestock; the adjacent uncultivated land that supports other vegetation and wildlife; and the associated atmosphere, the underlying soils, groundwater, and drainage networks.

AHERA Designated Person (ADP): A person designated by a Local Education Agency to ensure that the AHERA requirements for asbestos management and abatement are properly implemented.

Air Changes Per Hour (ACH): The movement of a volume of air in a given period of time; if a house has one air change per hour, it means that all of the air in the house will be replaced in a one-hour period.

Air Contaminant: Any particulate matter, gas, or combination thereof, other than water vapor. (See: air pollutant.)

Air Curtain: A method of containing oil spills. Air bubbling through a perforated pipe causes an upward water flow that slows the spread of oil. It can also be used to stop fish from entering polluted water.

Air Mass: A large volume of air with certain meteorological or polluted characteristics-e.g. a heat inversion or smoggy-ness-while in one location. The characteristics can change as the air mass moves away.

Air Monitoring: (See: monitoring)

Air Plenum: Any space used to convey air in a building, furnace, or structure. The space above a suspended ceiling is often used as an air plenum.

Air Pollutant: Any substance in air that could, in high enough concentration, harm man, other animals, vegetation, or material. Pollutants may include almost any natural or artificial composition of airborne matter capable of being airborne. They may be in the form of solid particles, liquid droplets, gases, or in combination thereof. Generally, they fall into two main groups: (1) those emitted directly from identifiable sources and (2) those produced in the air by interaction between two or more primary pollutants, or by reaction with normal atmospheric constituents, with or without photoactivation. Exclusive of pollen, fog, and dust, which are of natural origin, about 100 contaminants have been identified and fall into the following categories: solids, sulfur compounds, volatile organic chemicals, nitrogen compounds, oxygen compounds, halogen compounds, radioactive compounds, and odors.

Air Pollution Episode: A period of abnormally high concentration of air pollutants, often due to low winds and temperature inversion, that can cause illness and death. (See: episode, pollution.)

Air Pollution Control Device: Mechanism or equipment that cleans emissions generated by an incinerator by removing pollutants that would otherwise be released to the atmosphere.

Air Pollution: The presence of contaminant or pollutant substances in the air that do not disperse properly and interfere with human health or welfare, or produce other harmful environmental effects.

Air Quality Criteria: The levels of pollution and lengths of exposure above which adverse health and welfare effects may occur.

Air Quality Control Region: An area designated by the federal government in which communities share a common air pollution problem, sometimes embracing several states.

Air Quality Standards: The level of pollutants prescribed by regulations that may not be exceeded during a given time in a defined area.

Air Stripping: A treatment system that removes volatile organic compounds (VOCs) from contaminated ground water or surface water by forcing an airstream through the water and causing the compounds to evaporate.

Air Toxics: Any air pollutant for which a national ambient air quality standard (NAAQS) does not exist (i.e., excluding ozone, carbon monoxide, PM-10, sulfur dioxide, nitrogen oxide) that may reasonably be anticipated to cause cancer, developmental effects, reproductive dysfunctions, neurological disorders, heritable gene mutations, or other serious or irreversible chronic or acute health effects in humans.

Airborne Particulates: Total suspended particulate matter found in the atmosphere as solid particles or liquid droplets. Chemical composition of particulates varies widely, depending on location and time of year. Airborne particulates include: windblown dust, emissions from industrial processes, smoke from the burning of wood and coal, and motor vehicle or non-road engine exhausts. exhaust of motor vehicles.

Airborne Release: Release of any chemical into the air.

Alachlor: A herbicide, marketed under the trade name Lasso, used mainly to control weeds in corn and soybean fields.

Alar: Trade name for daminozide, a pesticide that makes apples redder, firmer, and less likely to drop off trees before growers are ready to pick them. It is also used to a lesser extent on peanuts, tart cherries, concord grapes, and other fruits.

Aldicarb: An insecticide sold under the trade name Temik. It is made from ethyl isocyanate.

Algae: Simple rootless plants that grow in sunlit waters in proportion to the amount of available nutrients. They can affect water quality adversely by lowering the dissolved oxygen in the water. They are food for fish and small aquatic animals.

Algal Blooms: Sudden spurts of algal growth, which can affect water quality adversely and indicate potentially hazardous changes in local water chemistry.

Alternate Method: Any method of sampling and analyzing for an air pollutant that is not a reference or equivalent method but that has been demonstrated in specific cases to EPA's satisfaction to produce results adequate for compliance monitoring.

Alternative Remedial Contract Strategy Contractors: Government contractors who provide project management and technical services to support remedial response activities at National Priorities List sites.

Ambient Air Quality Standards: (See: Criteria Pollutants and National Ambient Air Quality Standards.)

Ambient Air: Any unconfined portion of the atmosphere: open air, surrounding air.

Anaerobic: A life or process that occurs in, or is not destroyed by, the absence of oxygen.

Anaerobic Decomposition: Reduction of the net energy level and change in chemical composition of organic matter caused by microorganisms in an oxygen-free environment.

Antarctic "Ozone Hole": Refers to the seasonal depletion of ozone in a large area over Antarctica.

Anti-Degradation Clause: Part of federal air quality and water quality requirements prohibiting deterioration where pollution levels are above the legal limit.

Applicable or Appropriate Requirements (ARARs): Any state or federal statute that pertains to protection of human life and the environment in addressing specific conditions or use of a particular cleanup technology at a Superfund site.

Aquifer: An underground geological formation, or group of formations, containing usable amounts of groundwater that can supply wells and springs.

Area of Review: In the UIC program, the area surrounding an injection well that is reviewed during the permitting process to determine if flow between aquifers will be induced by the injection operation.

Area Source: Any small source of non-natural air pollution that is released over a relatively small area but which cannot be classified as a point source. Such sources may include vehicles and other small engines, small businesses and household activities.

Aromatics: A type of hydrocarbon, such as benzene or toluene, added to gasoline in order to increase octane. Some aromatics are toxic.

Arsenicals: Pesticides containing arsenic.

Asbestos: A mineral fiber that can pollute air or water and cause cancer or asbestosis when inhaled. EPA has banned or severely restricted its use in manufacturing and construction.

Asbestos Abatement: Procedures to control fiber release from asbestos-containing materials in a building or to remove them entirely, including removal, encapsulation, repair, enclosure, encasement, and operations and maintenance programs.

Asbestos-Containing Waste Materials (ACWM): Mill tailings or any waste that contains commercial asbestos and is generated by a source covered by the Clean Air Act Asbestos NESHAPS.

Asbestosis: A disease associated with inhalation of asbestos fibers. The disease makes breathing progressively more difficult and can be fatal.

Asbestos Program Manager: A building owner or designated representative who supervises all aspects of the facility asbestos management and control program.

Ash: The mineral content of a product remaining after complete combustion.

Assessment: In the asbestos-in-schools program, the evaluation of the physical condition and potential for damage of all friable asbestos containing materials and thermal insulation systems.

Assimilation: The ability of a body of water to purify itself of pollutants.

Assimilative Capacity: The capacity of a natural body of water to receive wastewaters or toxic materials without deleterious effects and without damage to aquatic life or humans who consume the water.

Attainment Area: An area considered to have air quality as good as or better than the national ambient air quality standards as defined in the Clean Air Act. An area may be an attainment area for one pollutant and a non-attainment area for others.

Attenuation: The process by which a compound is reduced in concentration over time, through absorption, adsorption, degradation, dilution, and/or transformation.

Attractant: A chemical or agent that lures insects or other pests by stimulating their sense of smell.

Attrition: Wearing or grinding down of a substance by friction. Dust from such processes contributes to air pollution.

Availability Session: Informal meeting at a public location where interested citizens can talk with EPA and state officials on a one-to-one basis.

B

Background Level: In air pollution control, the concentration of air pollutants in a definite area during a fixed period of time prior to the starting up or on the stoppage of a source of emission under control. In toxic substances monitoring, the average presence in the environment, originally referring to naturally occurring phenomena.

BACT-Best Available Control Technology: An emission limitation based on the maximum degree of emission reduction (considering energy, environmental, and economic impacts) achievable through application of production processes and available methods, systems, and techniques. BACT does not permit emissions in excess of those allowed under any applicable Clean Air Act provisions. Use of the BACT concept is allowable on a case by case basis for major new or modified emissions sources in attainment areas and applies to each regulated pollutant.

Bacteria: (Singular: bacterium) Microscopic living organisms that can aid in pollution control by metabolizing organic matter in sewage, oil spills or other pollutants. However, bacteria in soil, water or air can also cause human, animal and plant health problems.

Baffle Chamber: In incinerator design, a chamber designed to promote the settling of fly ash and coarse particulate matter by changing the direction and/or reducing the velocity of the gases produced by the combustion of the refuse or sludge.

Baghouse Filter: Large fabric bag, usually made of glass fibers, used to eliminate intermediate and large (greater than 20 microns in diameter) particles. This device operates like the bag of an electric vacuum cleaner, passing the air and smaller particles while entrapping the larger ones.

Baling: Compacting solid waste into blocks to reduce volume and simplify handling.

Ballistic Separator: A machine that sorts organic from inorganic matter for composting.

Band Application: The spreading of chemicals over, or next to, each row of plants in a field.

Banking: A system for recording qualified air emission reductions for later use in bubble, offset, or netting transactions. (See: emissions trading.)

Bar Screen: In wastewater treatment, a device used to remove large solids.

Barrier Coating(s): A layer of a material that obstructs or prevents passage of something through a surface that is to be protected, e.g. grout, caulk, or various sealing compounds; sometimes used with polyurethane membranes to prevent corrosion or oxidation of metal surfaces, chemical impacts on various materials, or, for example, to prevent radon infiltration through walls, cracks, or joints in a house.

Basal Application: In pesticides, the application of a chemical on plant stems or tree trunks just above the soil line.

Bed Load: Sediment particles resting on or near the channel bottom that are pushed or rolled along by the flow of water.

BEN: EPA's computer model for analyzing a violator's economic gain from not complying with the law.

Bench-scale Tests: Laboratory testing of potential cleanup technologies (See: treatability studies.)

Beryllium: An airborne metal hazardous to human health when inhaled. It is discharged by machine shops, ceramic and propellant plants, and foundries.

Best Available Control Measures (BACM): A term used to refer to the most effective measures (according to EPA guidance) for controlling small or dispersed particulates from sources such as roadway dust, soot and ash from woodstoves and open burning of rush, timber, grasslands, or trash.

Best Demonstrated Available Technology (BDAT): As identified by EPA, the most effective commercially available means of treating specific types of hazardous waste. The BDATs may change with advances in treatment technologies.

Best Management Practice (BMP): Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from non-point sources.

Bimetal: Beverage containers with steel bodies and aluminum tops; handled differently from pure aluminum in recycling.

Bioaccumulants: Substances that increase in concentration in living organisms as they take in contaminated air, water, or food because the substances are very slowly metabolized or excreted. (See: biological magnification.)

Bioassay: Study of living organisms to measure the effect of a substance, factor, or condition by comparing before-and-after exposure or other data.

Biochemical Oxygen Demand (BOD): A measure of the amount of oxygen consumed in the biological processes that break down organic matter in water. The greater the BOD, the greater the degree of pollution.

Biodegradable: Capable of decomposing rapidly under natural conditions.

Biodiversity: Refers to the variety and variability among living organisms and the ecological complexes in which they occur. Diversity can be defined as the number of different items and their relative frequencies. For biological diversity, these items are organized at many levels, ranging from complete ecosystems to the biochemical structures that are the molecular basis of heredity. Thus, the term encompasses different ecosystem, species, and genes.

Biological Control: In pest control, the use of animals and organisms that eat or otherwise kill or out-compete pests.

Biological Magnification: Refers to the process whereby certain substances such as pesticides or heavy metals move up the food chain, work their way into rivers or lakes, and are eaten by aquatic organisms such as fish, which in turn are eaten by large birds, animals or humans. The substances become concentrated in tissues or internal organs as they move up the chain. (See: bioaccumulative.)

Biological Oxidation: Decomposition of complex organic materials by microorganisms. Occurs in self-purification of water bodies and in activated sludge wastewater treatment.

Biological Oxygen Demand (BOD): An indirect measure of the concentration of biologically degradable material present in organic wastes. It usually reflects the amount of oxygen consumed in five days by biological processes breaking down organic waste.

Biological Treatment: A treatment technology that uses bacteria to consume organic waste.

Biologicals: Vaccines, cultures and other preparations made from living organisms and their products, intended for use in diagnosing, immunizing, or treating humans or animals, or in related research.

Biomass: All of the living material in a given area; often refers to vegetation.

Biome: Entire community of living organisms in a single major ecological area. (See: biotic community.)

Biomonitoring: 1. The use of living organisms to test the suitability of effluents for discharge into receiving waters and to test the quality of such waters downstream from the discharge. 2. Analysis of blood, urine, tissues, etc., to measure chemical exposure in humans.

Bioremediation: Use of living organisms to clean up oil spills or remove other pollutants from soil, water, or wastewater; use of organisms such as non-harmful insects to remove agricultural pests or counteract diseases of trees, plants, and garden soil.

Biosphere: The portion of Earth and its atmosphere that can support life.

Biostabilizer: A machine that converts solid waste into compost by grinding and aeration.

Biota: The animal and plant life of a given region.

Biotechnology: Techniques that use living organisms or parts of organisms to produce a variety of products (from medicines to industrial enzymes) to improve plants or animals or to develop microorganisms to remove toxics from bodies of water, or act as pesticides.

Biotic Community: A naturally occurring assemblage of plants and animals that live in the same environment and are mutually sustaining and interdependent. (See: biome.)

Blackwater: Water that contains animal, human, or food waste.

Blood Products: Any product derived from human blood, including but not limited to blood plasma, platelets, red or white corpuscles, and derived licensed products such as interferon.

Bloom: A proliferation of algae and/or higher aquatic plants in a body of water; often related to pollution, especially when pollutants accelerate growth.

BOD5: The amount of dissolved oxygen consumed in five days by biological processes breaking down organic matter.

Bog: A type of wetland that accumulates appreciable peat deposits. Bogs depend primarily on precipitation for their water source, and are usually acidic and rich in plant residue with a conspicuous mat of living green moss.

Boom: 1. A floating device used to contain oil on a body of water. 2. A piece of equipment used to apply pesticides from a tractor or truck. (See: sonic boom.)

Botanical Pesticide: A pesticide whose active ingredient is a plant-produced chemical such as nicotine or strychnine. Also called a plant-derived pesticide.

Bottle Bill: Proposed or enacted legislation which requires a returnable deposit on beer or soda containers and provides for retail store or other redemption. Such legislation is designed to discourage use of throwaway containers.

Bottom Ash: The non-airborne combustion residue from burning pulverized coal in a boiler; the material which falls to the bottom of the boiler and is removed mechanically; a concentration of the non-combustible materials, which may include toxics.

Bottom Land Hardwoods: Forested freshwater wetlands adjacent to rivers in the southeastern United States, especially valuable for wildlife breeding, nesting and habitat.

Brine Mud: Waste material, often associated with well-drilling or mining, composed of mineral salts or other inorganic compounds.

Building Cooling Load: The hourly amount of heat that must be removed from a building to maintain indoor comfort (measured in British Thermal Units BTUs).

Broadcast Application: The spreading of pesticides over an entire area.

Bubble Policy: (See: emissions trading.)

Bubble: A system under which existing emissions sources can propose alternate means to comply with a set of emissions limitations; under the bubble concept, sources can control more than required at one emission point where control costs are relatively low in return for a comparable relaxation of controls at a second emission point where costs are higher.

Buffer Strips: Strips of grass or other erosion-resisting vegetation between or below cultivated strips or fields.

Bulk Sample: A small portion (usually thumbnail size) of a suspect asbestos-containing building material collected by an asbestos inspector for laboratory analysis to determine asbestos content.

Bulky Waste: Large items of waste materials, such as appliances, furniture, large auto parts, trees, stumps.

Burial Ground (Graveyard): A disposal site for radioactive waste materials that uses earth or water as a shield.

By-product: Material, other than the principal product, generated as a consequence of an industrial process.

C

Cadmium (Cd): A heavy metal element that accumulates in the environment.

Cancellation: Refers to Section 6 (b) of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) which authorizes cancellation of a pesticide registration if unreasonable adverse effects to the environment and public health develop when a product is used according to widespread and commonly recognized practice, or if its labeling or other material required to be submitted does not comply with FIFRA provisions.

Cap: A layer of clay, or other impermeable material installed over the top of a closed landfill to prevent entry of rainwater and minimize leachate.

Capacity Assurance Plan: A statewide plan which supports a state's ability to manage the hazardous waste generated within its boundaries over a twenty year period.

Capture Efficiency: The fraction of organic vapors generated by a process that are directed to an abatement or recovery device.

Carbon Absorber: An add-on control device that uses activated carbon to absorb volatile organic compounds from a gas stream. (The VOCs are later recovered from the carbon.)

Carbon Adsorption: A treatment system that removes contaminants from ground water or surface water by forcing it through tanks containing activated carbon treated to attract the contaminants, contaminants.

Carbon Monoxide (CO): A colorless, odorless, poisonous gas produced by incomplete fossil fuel combustion.

Carboxyhemoglobin: Hemoglobin in which the iron is bound to carbon monoxide (CO) instead of oxygen.

Carcinogen: Any substance that can cause or aggravate cancer.

Carrier: The inert liquid or solid material added to an active ingredient in a pesticide.

Carrying Capacity: 1. In recreation management, the amount of use a recreation area can sustain without loss of quality. 2. In wildlife management, the maximum number of animals an area can support during a given period.

Cask: A thick-walled container (usually lead) used to transport radioactive material. Also called a coffin.

Catalytic Converter: An air pollution abatement device that removes pollutants from motor vehicle exhaust, either by oxidizing them into carbon dioxide and water or reducing them to nitrogen and oxygen.

Catalytic Incinerator: A control device that oxidizes volatile organic compounds (VOCs) by using a catalyst to promote the combustion process. Catalytic incinerators require lower temperatures than conventional thermal incinerators, thus saving fuel and other costs.

Categorical Exclusion: A class of actions which either individually or cumulatively would not have a significant effect on the human environment and therefore would not require preparation of an environmental assessment or environmental impact statement under the National Environmental Policy Act (NEPA).

Categorical Pretreatment Standard: A technology-based effluent limitation for an industrial facility discharging into a municipal sewer system. Analogous in stringency to Best Availability Technology (BAT) for direct dischargers.

Cathodic Protection: A technique to prevent corrosion of a metal surface by making it the cathode of an electrochemical cell.

Cells: 1. In solid waste disposal, holes where waste is dumped, compacted, and covered with layers of dirt on a daily basis. 2. The smallest structural part of living matter capable of functioning as an independent unit.

Cementitious: Densely packed and non-fibrous friable materials.

Central Collection Point: Location where a generator of regulated medical waste consolidates wastes originally generated at various locations in his facility. The wastes are gathered together for treatment on-site or for transportation elsewhere for treatment and/or disposal. This term could also apply to community hazardous waste collections, industrial and other waste management systems.

Centrifugal Collector: A mechanical system using centrifugal force to remove aerosols from a gas stream or to de-water sludge.

Channelization: Straightening and deepening streams so water will move faster, a marsh-drainage tactic that can interfere with waste assimilation capacity, disturb fish and wildlife habitats, and aggravate flooding.

Characteristic: Any one of the four categories used in defining hazardous waste: ignitability, corrosivity, reactivity, and toxicity.

Chemical Oxygen Demand (COD): A measure of the oxygen required to oxidize all compounds, both organic and inorganic, in water.

Chemical Treatment: Any one of a variety of technologies that use chemicals or a variety of chemical processes to treat waste.

Chemnet: Mutual aid network of chemical shippers and contractors that assigns a contracted emergency response company to provide technical support if a representative of the firm whose chemicals are involved in an incident is not readily available.

Chemosterilant: A chemical that controls pests by preventing reproduction.

Chemterc: The industry-sponsored Chemical Transportation Emergency Center; provides information and/or emergency assistance to emergency responders.

Chilling Effect: The lowering of the Earth's temperature because of increased particles in the air blocking the sun's rays. (See: greenhouse effect.)

Chlorinated Hydrocarbons: These include a class of persistent, broad-spectrum insecticides that linger in the environment and accumulate in the food chain. Among them are DDT, aldrin, dieldrin, heptachlor, chlordane, lindane, endrin, mirex, hexachloride, and toxaphene. Other examples include TCE, used as an industrial solvent.

Chlorinated Solvent: An organic solvent containing chlorine atoms, e.g., methylene chloride and 1,1,1-trichloromethane, used in aerosol spray containers and in highway paint.

Chlorination: The application of chlorine to drinking water, sewage, or industrial waste to disinfect or to oxidize undesirable compounds.

Chlorinator: A device that adds chlorine, in gas or liquid form, to water or sewage to kill infectious bacteria.

Chlorine-Contact Chamber: That part of a water treatment plant where effluent is disinfected by chlorine.

Chlorofluorocarbons (CFCs): A family of inert, nontoxic, and easily liquified chemicals used in refrigeration, air conditioning, packaging, insulation, or as solvents and aerosol propellants. Because CFCs are not destroyed in the lower atmosphere they drift into the upper atmosphere where their chlorine components destroy ozone.

Chlorosis: Discoloration of normally green plant parts caused by disease, lack of nutrients, or various air pollutants.

Cholinesterase: An enzyme found in animals that regulates nerve impulses. Cholinesterase inhibition is associated with a variety of acute symptoms such as nausea, vomiting, blurred vision, stomach cramps, and rapid heart rate.

Chromium: (See: heavy metals.)

Chronic Effect: An adverse effect on a human or animal in which symptoms recur frequently or develop slowly over a long period of time.

Chronic Toxicity: The capacity of a substance to cause long-term poisonous human health effects. (See: acute toxicity.)

Clarification: Clearing action that occurs during wastewater treatment when solids settle out. This is often aided by centrifugal action and chemically induced coagulation in wastewater.

Clarifier: A tank in which solids settle to the bottom and are subsequently removed as sludge.

Clay Soil: Soil material containing more than 40 percent clay, less than 45 percent sand, and less than 40 percent silt.

Clean Coal Technology: Any technology not in widespread use prior to the Clean Air Act amendments of 1990. This Act will achieve significant reductions in pollutants associated with the burning of coal.

Clean Fuels: Blends or substitutes for gasoline fuels, including compressed natural gas, methanol, ethanol, liquified petroleum gas, and others.

Cleanup: Actions taken to deal with a release or threat of release of a hazardous substance that could affect humans and/or the environment. The term "cleanup" is sometimes used interchangeably with the terms remedial action, removal action, response action, or corrective action.

Clear Cut: Harvesting all the trees in one area at one time, a practice that can encourage fast rainfall or snowmelt runoff, erosion, sedimentation of streams and lakes, flooding, and destroys vital habitat.

Cloning: In biotechnology, obtaining a group of genetically identical cells from a single cell; making identical copies of a gene.

Closed-Loop Recycling: Reclaiming or reusing wastewater for non-potable purposes in an enclosed process.

Closure: The procedure a landfill operator must follow when a landfill reaches its legal capacity for solid waste: ceasing acceptance of solid waste and placing a cap on the landfill site.

Coagulation: Clumping of particles in wastewater to settle out impurities, often induced by chemicals such as lime, alum, and iron salts.

Coastal Zone: Lands and waters adjacent to the coast that exert an influence on the uses of the sea and its ecology, or whose uses and ecology are affected by the sea.

Coefficient of Haze (COH): A measurement of visibility interference in the atmosphere.

Coke Oven: An industrial process which converts coal into coke, one of the basic materials used in blast furnaces for the conversion of iron ore into iron.

Cold Temperature CO: A standard for automobile carbon monoxide (CO) emissions to be met at a low temperature (i.e. 20 degrees Fahrenheit). Conventional automobile catalytic converters are less efficient upon start-up at low temperatures.

Coliform Index: A rating of the purity of water based on a count of fecal bacteria.

Coliform Organism: Microorganisms found in the intestinal tract of humans and animals. Their presence in water indicates fecal pollution and potentially adverse contamination by pathogens.

Collector Sewers: Pipes used to collect and carry wastewater from individual sources to an interceptor sewer that will carry it to a treatment facility.

Combined Sewer Overflows: Discharge of a mixture of storm water and domestic waste when the flow capacity of a sewer system is exceeded during rainstorms.

Combined Sewers: A sewer system that carries both sewage and storm-water runoff. Normally, its entire flow goes to a waste treatment plant, but during a heavy storm, the volume of water may be so great as to cause overflows of untreated mixtures of storm water and sewage into receiving waters. Storm-water runoff may also carry toxic chemicals from industrial areas or streets into the sewer system.

Combustion: 1. Burning, or rapid oxidation, accompanied by release of energy in the form of heat and light. A basic cause of air pollution. 2. Refers to controlled burning of waste, in which heat chemically alters organic compounds, converting into stable inorganics such as carbon dioxide and water.

Combustion Chamber: The actual compartment where waste is burned in an incinerator.

Combustion Product: Substance produced during the burning or oxidation of a material.

Command Post: Facility located at a safe distance upwind from an accident site, where the on-scene coordinator, responders, and technical representatives make response decisions, deploy manpower and equipment, maintain liaison with news media, and handle communications.

Comment Period: Time provided for the public to review and comment on a proposed EPA action or rulemaking after publication in the Federal Register.

Commercial Waste Management Facility: A treatment, storage, disposal, or transfer facility which accepts waste from a variety of sources, as compared to a private facility which normally manages a limited waste stream generated by its own operations.

Commercial Waste: All solid waste emanating from business establishments such as stores, markets, office buildings, restaurants, shopping centers, and theaters.

Commingle Recyclables: Mixed recyclables that are collected together.

Comminuter: A machine that shreds or pulverizes solids to make waste treatment easier.

Comminution: Mechanical shredding or pulverizing of waste. Used in both solid waste management and wastewater treatment.

Community: In ecology, a group of interacting populations in time and space. Sometimes, a particular subgrouping may be specified, such as the fish community in a lake or the soil arthropod community in a forest.

Community Relations: The EPA effort to establish two-way communication with the public to create understanding of EPA programs and related actions, to assure public input into decision-making processes related to affected communities, and to make certain that the Agency is aware of and responsive to public concerns. Specific community relations activities are required in relation to Superfund remedial actions.

Community Water System: A public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

Compaction: Reduction of the bulk of solid waste by rolling and tamping.

Compliance Coating: A coating whose volatile organic compound content does not exceed that allowed by regulation.

Compliance Monitoring: Collection and evaluation of data, including self-monitoring reports, and verification to show whether pollutant concentrations and loads contained in permitted discharges are in compliance with the limits and conditions specified in the permit.

Compliance Schedule: A negotiated agreement between a pollution source and a government agency that specifies dates and procedures by which a source will reduce emissions and, thereby, comply with a regulation.

Composite Sample: A series of water samples taken over a given period of time and weighted by flow rate.

Compost: The relatively stable humus material that is produced from a composting process in which bacteria in soil mixed with garbage and degradable trash break down the mixture into organic fertilizer.

Composting: The controlled biological decomposition of organic material in the presence of air to form a humus-like material. Controlled methods of composting include mechanical mixing and aerating, ventilating the materials by dropping them through a vertical series of aerated chambers, or placing the compost in piles out in the open air and mixing it or turning it periodically.

Conditional Registration: Under special circumstances, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) permits registration of pesticide products that is "conditional" upon the submission of additional data. These special circumstances include a finding by the EPA Administrator that a new product or use of an existing pesticide will not significantly increase the risk of unreasonable adverse effects. A product containing a new (previously unregistered) active ingredient may be conditionally registered only if the Administrator finds that such conditional registration is in the public interest, that a reasonable time for conducting the additional studies has not elapsed, and the use of the pesticide for the period of conditional registration will not present an unreasonable risk.

Conditionally Exempt Generators (CE): Persons or enterprises which produce less than 220 pounds of hazardous waste per month. Exempt from most regulation, they are required merely to determine whether their waste is hazardous, notify appropriate state or local agencies, and ship it by permitted facility for proper disposal. (See: an authorized transporter to a small quantity generator.)

Cone of Depression: A depression in the water table that develops around a pumped well.

Confined Aquifer: An aquifer in which ground water is confined under pressure which is significantly greater than atmospheric pressure.

Consent Decree: A legal document, approved by a judge, that formalizes an agreement reached between EPA and potentially responsible parties (PRPs) through which PRPs will conduct all or part of a cleanup action at a Superfund site; cease or correct actions or processes that are polluting the environment; or otherwise comply with EPA initiated regulatory enforcement actions to resolve the contamination at the Superfund site involved. The consent decree describes the actions PRPs will take and may be subject to a public comment period.

Conservation: Preserving and renewing, when possible, human and natural resources. The use, protection, and improvement of natural resources according to principles that will assure their highest economic or social benefits.

Construction and Demolition Waste: Waste building materials, dredging materials, tree stumps, and rubble resulting from construction, remodeling, repair, and demolition of homes, commercial buildings and other structures and pavements. May contain lead, asbestos, or other hazardous substances.

Contact Pesticide: A chemical that kills pests when it touches them, instead of by ingestion. Also, soil that contains the minute skeletons of certain algae that scratch and dehydrate waxy-coated insects.

Contaminant: Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil.

Contingency Plan: A document setting out an organized, planned, and coordinated course of action to be followed in case of a fire, explosion, or other accident that releases toxic chemicals, hazardous waste, or radioactive materials that threaten human health or the environment. (See: National Oil and Hazardous Substances Contingency Plan.)

Continuous Discharge: A routine release to the environment that occurs without interruption, except for infrequent shut-downs for maintenance, process changes, etc.

Contour Plowing: Soil tilling method that follows the shape of the land to discourage erosion.

Contract Labs: Laboratories under contract to EPA, which analyze samples taken from waste, soil, air, and water or carry out research projects.

Control Technique Guidelines (CTG): A series of EPA documents designed to assist states in defining reasonable available control technology (RACT) for major sources of volatile organic compounds (VOC).

Controlled Reaction: A chemical reaction under temperature and pressure conditions maintained within safe limits to produce a desired product or process.

Conventional Pollutants: Statutorily listed pollutants understood well by scientists. These may be in the form of organic waste, sediment, acid, bacteria, viruses, nutrients, oil and grease, or heat.

Conventional Systems: Systems that have been traditionally used to collect municipal wastewater in gravity sewers and convey it to a central primary or secondary treatment plant prior to discharge to surface waters.

Conventional Tilling: Tillage operations considered standard for a specific location and crop and that tend to bury the crop residues; usually considered as a base for determining the cost effectiveness of control practices.

Cooling Electricity Use: Amount of electricity used to meet the building cooling load. (See: building cooling load.)

Cooling Tower: A structure that helps remove heat from water used as a coolant; e.g., in electric power generating plants.

Cooperative Agreement: An assistance agreement whereby EPA transfers money, property, services or anything of value to a state for the accomplishment of CERC-authorized activities or tasks.

Core: The uranium-containing heart of a nuclear reactor, where energy is released.

Core Program Cooperative Agreement: An assistance agreement whereby EPA supports states or tribal governments with funds to help defray the cost of non-item-specific administrative and training activities.

Corrosion: The dissolution and wearing away of metal caused by a chemical reaction such as between water and the pipes, chemicals touching a metal surface, or contact between two metals.

Corrosive: A chemical agent that reacts with the surface of a material causing it to deteriorate or wear away.

Cost-Effective Alternative: An alternative control or corrective method identified after analysis as being the best available in terms of reliability, performance, and cost. Although costs are one important consideration, regulatory and compliance analysis does not require EPA to choose the least expensive alternative. For example, when selecting a method for cleaning up a site on the Superfund National Priorities List, the Agency balances costs with the long-term effectiveness of the methods proposed.

Cost Recovery: A legal process by which potentially responsible parties who contributed to contamination at a Superfund site can be required to reimburse the Trust Fund for money spent during any cleanup actions by the federal government.

Cover Material: Soil used to cover compacted solid waste in a sanitary landfill.

Cover: Vegetation or other material providing protection as ground cover.

Cradle-to-Grave or Manifest System: A procedure in which hazardous materials are identified and followed as they are produced, treated, transported, and disposed of by a series of permanent, linkable, descriptive documents (e.g., manifests). Commonly referred to as the cradle-to-grave system.

Criteria Pollutants: The 1970 amendments to the Clean Air Act required EPA to set National Ambient Air Quality Standards for certain pollutants known to be hazardous to human health. EPA has identified and set standards to protect human health and welfare for six pollutants: ozone, carbon monoxide, total suspended particulates, sulfur dioxide, lead, and nitrogen oxide. The term, "criteria pollutants" derives from the requirement that EPA must describe the characteristics and potential health and welfare effects of these pollutants. It is on the basis of these criteria that standards are set or revised.

Criteria: Descriptive factors taken into account by EPA in setting standards for various pollutants. These factors are used to determine limits on allowable concentration levels, and to limit the number of violations per year. When issued by EPA, the criteria provide guidance to the states on how to establish their standards.

Crop Consumptive Use: The amount of water transpired during plant growth plus what evaporated from the soil surface and foliage in the crop area.

Cubic Feet Per Minute (CFM): A measure of the volume of a substance flowing through air within a fixed period of time. With regard to indoor air, refers to the amount of air, in cubic feet, that is exchanged with indoor air in a minute's time, i.e., the air exchange rate.

Cullet: Crushed glass.

Cultural Eutrophication: Increasing rate at which water bodies "die" by pollution from human activities.

Cultures and Stocks: Infectious agents and associated biologicals including: cultures from medical and pathological laboratories; cultures and stocks of infectious agents from research and industrial laboratories; waste from the production of biologicals; discarded live and attenuated vaccines; and culture dishes and devices used to transfer, inoculate, and mix cultures. (See: regulated medical waste.)

Cumulative Working Level Months (CWLWM): The sum of lifetime exposure to radon working levels expressed in total working level months.

Curbside Collection: Method of collecting recyclable materials at homes, community districts or businesses.

Cutie-Pie: An instrument used to measure radiation levels.

Cyclone Collector: A device that uses centrifugal force to pull large particles from polluted air.

D

Data Call-In: A part of the Office of Pesticide Programs (OPP) process of developing key required test data, especially on the long-term, chronic effects of existing pesticides, in advance of scheduled Registration Standard reviews. Data Call-In from manufacturers is an adjunct of the Registration Standards program intended to expedite re-registration.

DDT: The first chlorinated hydrocarbon insecticide chemical name: Dichloro-Diphenyl-Trichloroethane. It has a half-life of 15 years and can collect in fatty tissues of certain animals. EPA banned registration and interstate sale of DDT for virtually all but emergency uses in the United States in 1972 because of its persistence in the environment and accumulation in the food chain.

Decay Products: Degraded radioactive materials, often referred to as "daughters" or "progeny"; radon decay products of most concern from a public health standpoint are polonium-214 and polonium-218.

Dechlorination: Removal of chlorine from a substance by chemically replacing it with hydrogen or hydroxide ions in order to detoxify a substances.

Decomposition: The breakdown of matter by bacteria and fungi, changing the chemical makeup and physical appearance of materials.

Decontamination: Removal of harmful substances such as noxious chemicals, harmful bacteria or other organisms, or radioactive material from exposed individuals, rooms and furnishings in buildings, or the exterior environment.

Deep-Well Injection: Deposition of raw or treated, filtered hazardous waste by pumping it into deep wells, where it is contained in the pores of permeable subsurface rock.

Deflocculating Agent: A material added to a suspension to prevent settling.

Defoliant: An herbicide that removes leaves from trees and growing plants.

Delegated State: A state (or other governmental entity such as a tribal government) that has received authority to administer an environmental regulatory program in lieu of a federal counterpart. As used in connection with NPDES, UIC, and PWS programs, the term does not connote any transfer of federal authority to a state.

Delist: Use of the petition process to have a facility's toxic designation rescinded.

Demand-side Waste Management: Prices whereby consumers use purchasing decisions to communicate to product manufacturers that they prefer environmentally sound products packaged with the least amount of waste, made from recycled or recyclable materials, and containing no hazardous substances.

Denitrification: The anaerobic biological reduction of nitrate to nitrogen gas.

Depletion Curve: In hydraulics, a graphical representation of water depletion from storage-stream channels, surface soil, and groundwater. A depletion curve can be drawn for base flow, direct runoff, or total flow.

Depressurization: A condition that occurs when the air pressure inside a structure is lower than the air pressure outside. Depressurization can occur when household appliances such as fireplaces or furnaces, that consume or exhaust house air, are not supplied with enough makeup air. Radon may be drawn into a house more rapidly under depressurized conditions.

Dermal Toxicity: The ability of a pesticide or toxic chemical to poison people or animals by contact with the skin. (See: contact pesticide.)

DES: A synthetic estrogen, diethylstilbestrol is used as a growth stimulant in food animals. Residues in meat are thought to be carcinogenic.

Desalination: [Desalinization] (1) Removing salts from ocean or brackish water by using various technologies. (2) Removal of salts from soil by artificial means, usually leaching.

Desiccant: A chemical agent that absorbs moisture; some desiccants are capable of drying out plants or insects, causing death.

Design Capacity: The average daily flow that a treatment plant or other facility is designed to accommodate.

Designated Pollutant: An air pollutant which is neither a criteria nor hazardous pollutant, as described in the Clean Air Act, but for which new source performance standards exist. The Clean Air Act does require states to control these pollutants, which include acid mist, total reduced sulfur (TRS), and fluorides.

Designated Uses: Those water uses identified in state water quality standards that must be achieved and maintained as required under the Clean Water Act. Uses can include cold water fisheries, public water supply, irrigation, etc.

Designer Bugs: Popular term for microbes developed through biotechnology that can degrade specific toxic chemicals at their source in toxic waste dumps or in ground water.

Destination Facility: The facility to which regulated medical waste is shipped for treatment and destruction, incineration, and/or disposal.

Destroyed Medical Waste: Regulated medical waste that has been ruined, torn apart, or mutilated through thermal treatment, melting, shredding, grinding, tearing, or breaking, so that it is no longer generally recognized as medical waste, but has not yet been treated (excludes compacted regulated medical waste.)

Destruction and Removal Efficiency (DRE): A percentage that represents the number of molecules of a compound removed or destroyed in an incinerator relative to the number of molecules entered the system (e.g., a DRE of 99.99 percent means that 9,999 molecules are destroyed for every 10,000 that enter; 99.99 percent is known as "four nines." For some pollutants, the RCRA removal requirement may be as stringent as "six nines.")

Destruction Facility: A facility that destroys regulated medical waste by mashing or mutilating it.

Desulfurization: Removal of sulfur from fossil fuels to reduce pollution.

Detectable Leak Rate: The smallest leak (from a storage tank), expressed in terms of gallons or liters-per-hour, that a test can reliably discern with a certain probability of detection or false alarm.

Detection Criterion: A predetermined rule to ascertain whether a tank is leaking or not. Most volumetric tests use a threshold value as the detection criterion. (See: volumetric tank tests.)

Detergent: Synthetic washing agent that helps to remove dirt and oil. Some contain compounds which kill useful bacteria and encourage algae growth when they are in wastewater that reaches receiving waters.

Development Effects: Adverse effects such as altered growth, structural abnormality, functional deficiency, or death observed in a developing organism.

Diatomaceous Earth (Diatomite): A chalk-like material (fossilized diatoms) used to filter out solid waste in wastewater treatment plants, also used as an active ingredient in some powdered pesticides.

Diazinon: An insecticide. In 1986, EPA banned its use on open areas such as sod farms and golf courses because it posed a danger to migratory birds. The ban did not apply to agricultural, home lawn or commercial establishment uses.

Dibenzofurans: A group of highly toxic organic compounds.

Dicofol: A pesticide used on citrus fruits.

Diffused Air: A type of aeration that forces oxygen into sewage by pumping air through perforated pipes inside a holding tank.

Digester: In wastewater treatment, a closed tank; in solid-waste conversion, a unit in which bacterial action is induced and accelerated in order to break down organic matter and establish the proper carbon to nitrogen ratio.

Digestion: The biochemical decomposition of organic matter, resulting in partial gasification, liquefaction, and mineralization of pollutants.

Dike: A low wall that can act as a barrier to prevent a spill from spreading.

Diluent: Any liquid or solid material used to dilute or carry an active ingredient.

Dilution Ratio: The relationship between the volume of water in a stream and the volume of incoming water. It affects the ability of the stream to assimilate waste.

Dinocap: A fungicide used primarily by apple growers to control summer diseases. EPA proposed restrictions on its use in 1986 when laboratory tests found it caused birth defects in rabbits.

Dinoseb: A herbicide that is also used as a fungicide and insecticide. It was banned by EPA in 1986 because it posed the risk of birth defects and sterility.

Dioxin: Any of a family of compounds known chemically as dibenzo-p-dioxins. Concern about them arises from their potential toxicity and contaminants in commercial products. Tests on laboratory animals indicate that it is one of the more toxic man-made compounds.

Direct Discharger: A municipal or industrial facility which introduces pollution through a defined conveyance or system such as outlet pipes; a point source.

Disinfectant: A chemical or physical process that kills pathogenic organisms in water. Chlorine is often used to disinfect sewage treatment effluent, water supplies, wells, and swimming pools.

Dispersant: A chemical agent used to break up concentrations of organic material such as spilled oil.

Disposables: Consumer products, other items, and packaging used once or a few times and discarded.

Disposal: Final placement or destruction of toxic, radioactive, or other wastes; surplus or banned pesticides or other chemicals; polluted soils; and drums containing hazardous materials from removal actions or accidental releases. Disposal may be accomplished through use of approved secure landfills, surface impoundments, land farming, deep-well injection, ocean dumping, or incineration.

Dissolved Oxygen (DO): The oxygen freely available in water, vital to fish and other aquatic life and for the prevention of odors. DO levels are considered a most important indicator of a water body's ability to support desirable aquatic life. Secondary and advanced waste treatment are generally designed to ensure adequate DO in waste-receiving waters.

Dissolved Solids: Disintegrated organic and inorganic material in water. Excessive amounts make water unfit to drink or use in industrial processes.

Distillation: The act of purifying liquids through boiling, so that the steam condenses to a pure liquid and the pollutants remain in a concentrated residue.

Diversion: A channel with a supporting ridge on the lower side constructed across a slope to divert water at a non-erosive velocity to sites where it can be used or disposed of through a stable outlet.

Diversion Rate: The percentage of waste materials diverted from traditional disposal such as landfilling or incineration to be recycled, composted, or re-used.

DNA Hybridization: Use of a segment of DNA, called a DNA probe, to identify its complementary DNA; used to detect specific genes.

Dose Response: How a biological organism's response to a toxic substance quantitatively shifts as its overall exposure to the substance changes (e.g., a small dose of carbon monoxide may cause drowsiness; a large dose can be fatal.)

DOT Reportable Quantity: The quantity of a substance specified in U.S. Department of Transportation regulation that triggers labeling, packaging and other requirements related to shipping such substances.

Draft Permit: A preliminary permit drafted and published by EPA; subject to public review and comment before final action on the application.

Dredging: Removal of mud from the bottom of water bodies. This can disturb the ecosystem and causes silting that kills aquatic life. Dredging of contaminated muds can expose biota to heavy metals and other toxics. Dredging activities may be subject to regulation under Section 404 of the Clean Water Act.

Drop-off: Recyclable materials collection method in which individuals bring them to a designated collection site.

Dump: A site used to dispose of solid waste without environmental controls.

Dustfall Jar: An open container used to collect large particles from the air for measurement and analysis.

Dystrophic Lakes: Acidic, shallow bodies of water that contain much humus and/or other organic matter; contain many plants but few fish.

E

Ecological Impact: The effect that a man-made or natural activity has on living organisms and their non-living (abiotic) environment.

Ecology: The relationship of living things to one another and their environment, or the study of such relationships.

Ecological Indicator: A characteristic of the environment that, when measured, quantifies magnitude of stress, habitat characteristics, degree of exposure to a stressor, or ecological response to exposure. The term is a collective term for response, exposure. The term is a collective term for response, exposure, habitat, and stressor indicators.

Ecological Risk Assessment: The application of a formal framework, analytical process, or model to estimate the effects of human actions(s) on a natural resource and to interpret the significance of those effects in light of the uncertainties identified in each component of the assessment process. Such analysis includes initial hazard identification, exposure and dose-response assessments, and risk characterization.

Economic Poisons: Chemicals used to control pests and to defoliate cash crops such as cotton.

Ecosphere: The "bio-bubble" that contains life on earth, in surface waters, and in the air. (See: biosphere.)

Ecosystem: The interacting system of a biological community and its non-living environmental surroundings.

Ecosystem Structure: Attributes related to instantaneous physical state of an ecosystem; examples include species population density, species richness or evenness, and standing crop biomass.

Ecotone: A habitat created by the juxtaposition of distinctly different habitats; an edge habitat; or an ecological zone or boundary where two or more ecosystems meet.

Effluent: Wastewater-treated or untreated that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Effluent Guidelines: Technical EPA documents which set effluent limitations for given industries and pollutants.

Effluent Limitation: Restrictions established by a State or EPA on quantities, rates, and concentrations in wastewater discharges.

Effluent Standard: (See effluent limitation.)

Electrodialysis: A process that uses electrical current applied to permeable membranes to remove minerals from water. Often used to desalinize salty or brackish water.

Electrostatic Precipitator (ESP): A device that removes particles from a gas stream (smoke) after combustion occurs. The ESP imparts an electrical charge to the particles, causing them to adhere to metal plates inside the precipitator. Rapping on the plates causes the particles to fall into a hopper for disposal.

Eligible Costs: The construction costs for waste-water treatment works upon which EPA grants are based.

EMAP Data: Environmental monitoring data collected under the auspices of the Environmental Monitoring and Assessment Program. All EMAP data share the common attribute of being of known quality, having been collected in the context of explicit data quality objectives (DQOs) and a consistent quality assurance program.

Emergency (Chemical): A situation created by an accidental release or spill of hazardous chemicals that poses a threat to the safety of workers, residents, the environment, or property.

Emergency Episode: (See: air pollution episode.)

Emergency Response Values: Concentrations of chemicals, published by various groups, defining acceptable levels for short-term exposures in emergencies.

Emission: Pollution discharged into the atmosphere from smokestacks, other vents, and surface areas of commercial or industrial facilities; from residential chimneys; and from motor vehicle, locomotive, or aircraft exhausts.

Emission Factor: The relationship between the amount of pollution produced and the amount of raw material processed. For example, an emission factor for a blast furnace making iron would be the number of pounds of particulates per ton of raw materials.

Emission Inventory: A listing, by source, of the amount of air pollutants discharged into the atmosphere of a community; used to establish emission standards.

Emission Standard: The maximum amount of air polluting discharge legally allowed from a single source, mobile or stationary.

Emissions Trading: EPA policy that allows a plant complex with several facilities to decrease pollution from some facilities while increasing it from others, so long as total results are equal to or better than previous limits. Facilities where this is done are treated as if they exist in a bubble in which total emissions are averaged out. Complexes that reduce emissions substantially may "bank" their "credits" or sell them to other industries. **Encapsulation:** The treatment of asbestos-containing material with a liquid that covers the surface with a protective coating or embeds fibers in an adhesive matrix to prevent their release into the air.

Enclosure: Putting an airtight, impermeable, permanent barrier around asbestos-containing materials to prevent the release of asbestos fibers into the air.

Endangered Species: Animals, birds, fish, plants, or other living organisms threatened with extinction by man-made or natural changes in their environment. Requirements for declaring a species endangered are contained in the Endangered Species Act.

Endangerment Assessment: A study to determine the nature and extent of contamination at a site on the National Priorities List and the risks posed to public health or the environment. EPA or the state conduct the study when a legal action is to be taken to direct potentially responsible parties to clean up a site or pay for it. An endangerment assessment supplements a remedial investigation.

Energy Recovery: Obtaining energy from waste through a variety of processes (e.g., combustion.)

Enforceable Requirements: Conditions or limitations in permits issued under the Clean Water Act Section 402 or 404 that, if violated, could result in the issuance of a compliance order or initiation of a civil or criminal action under federal or applicable state laws. If a permit has not been issued, the term includes any requirement which, in the Regional Administrator's judgement, would be included in the permit when issued. Where no permit applies, the term includes any requirement which the RA determines is necessary for the best practical waste treatment technology to meet applicable criteria.

Enforcement: EPA, state, or local legal actions to obtain compliance with environmental laws, rules, regulations, or agreements and/or obtain penalties or criminal sanctions for violations. Enforcement procedures may vary, depending on the requirements of different environmental laws and related implementing regulations. Under CERCLA, for example, EPA will seek to require potentially responsible parties to clean up a Superfund site, or pay for the cleanup, whereas under the Clean Air Act the agency may invoke sanctions against cities failing to meet ambient air quality standards that could prevent certain types of construction or federal funding. In other situations, if investigations by EPA and state agencies uncover willful violations, criminal trials and penalties are sought.

Enforcement Decision Document (EDD): A document that provides an explanation to the public of EPA's selection of the cleanup alternative at enforcement sites on the National Priorities List. Similar to a Record of Decision.

Enhanced Inspection and Maintenance (I&M): An improved automobile inspection and maintenance program—aimed at reducing automobile emissions—that contains, at a minimum, more vehicle types and model years, tighter inspection, and better management practices. It may also include annual computerized or centralized inspections, under-the-hood inspection for signs of tampering with pollution control equipment, and increased repair waiver cost.

Enrichment: The addition of nutrients (e.g., nitrogen, phosphorus, carbon compounds) from sewage effluent or agricultural runoff to surface water, greatly increases the growth potential for algae and other aquatic plants.

Environment: The sum of all external conditions affecting the life, development and survival of an organism.

Environmental Assessment: An environmental analysis prepared pursuant to the National Environmental Policy Act to determine whether a federal action would significantly affect the environment and thus require a more detailed environmental impact statement.

Environmental Audit: An independent assessment of the current status of a party's compliance with applicable environmental requirements or of a party's environmental compliance policies, practices, and controls.

Environmental Impact Statement: A document required of federal agencies by the National Environmental Policy Act for major projects or legislative proposals significantly affecting the environment. A tool for decision making, it describes the positive and negative effects of the undertaking and cites alternative actions.

Environmental Indicator: A measurement, statistic or value that provides a proximate gauge or evidence of the effects of environmental management programs or of the state or condition of the environment.

Environmental Response Team: EPA experts located in Edison, N.J., and Cincinnati, OH, who can provide around-the-clock technical assistance to EPA regional offices and states during all types of hazardous waste site emergencies and spills of hazardous substances.

Epidemiology: Study of the distribution of disease, or other health-related states and events in human populations, as related to age, sex, occupation, ethnic, and economic status in order to identify and alleviate health problems and promote better health.

Epilimnion: Upper waters of a thermally stratified lake subject to wind action.

Episode (Pollution): An air pollution incident in a given area caused by a concentration of atmospheric pollutants under meteorological conditions that may result in a significant increase in illnesses or deaths. May also describe water pollution events or hazardous material spills.

Equilibrium: In relation to radiation, the state at which the radioactivity of consecutive elements within a radioactive series is neither increasing nor decreasing.

Equivalent Method: Any method of sampling and analyzing for air pollution which has been demonstrated to the EPA Administrator's satisfaction to be, under specific conditions, an acceptable alternative to normally used reference methods.

Erosion: The wearing away of land surface by wind or water, intensified by land-clearing practices related to farming, residential or industrial development, road building, or logging.

Estuary: Regions of interaction between rivers and near-shore ocean waters, where tidal action and river flow mix fresh and salt water. Such areas include bays, mouths of rivers, salt marshes, and lagoons. These brackish water ecosystems shelter and feed marine life, birds, and wildlife. (See: wetlands.)

Ethylene Dibromide (EDB): A chemical used as an agricultural fumigant and in certain industrial processes. Extremely toxic and found to be a carcinogen in laboratory animals, EDB has been banned for most agricultural uses in the United States.

Eutrophic Lakes: Shallow, murky bodies of water with concentrations of plant nutrients causing excessive production of algae. (See: dystrophic lakes.)

Eutrophication: The slow aging process during which a lake, estuary, or bay evolves into a bog or marsh and eventually disappears. During the later stages of eutrophication the water body is choked by abundant plant life due to higher levels of nutritive compounds such as nitrogen and phosphorus. Human activities can accelerate the process.

Evaporation Ponds: Areas where sewage sludge is dumped and dried.

Evapotranspiration: The loss of water from the soil both by evaporation and by transpiration from the plants growing in the soil.

Exceedance: Violation of the pollutant levels permitted by environmental protection standards.

Exclusion: In the asbestos program, one of several situations that permit a Local Education Agency (LEA) to delete one or more of the items required by the Asbestos Hazard Emergency Response Act (AHERA), e.g., records of previous asbestos sample collection and analysis may be used by the accredited inspector in lieu of AHERA bulk sampling.

Exclusionary Ordinance: Zoning that excludes classes of persons or businesses from a particular neighborhood or area.

Exempt Solvent: Specific organic compounds not subject to requirements of regulation because are deemed by EPA to be of negligible photochemical reactivity.

Exempted Aquifer: Underground bodies of water defined in the Underground Injection Control program as aquifers that are potential sources of drinking water though not being used as such, and thus exempted from regulations barring underground injection activities.

Exotic Species: A species that is not indigenous to a region.

Experimental Use Permit: Obtained by manufacturers for testing new pesticides or uses of thereof whenever they conduct experimental field studies to support registration on 10 acres or more on land or one acre or more of water.

Explosive Limits: The amounts of vapor in the air that form explosive mixtures; limits are expressed as lower and upper limits and give the range of vapor concentrations in air that will explode if an ignition source is present.

Exposure: The amount of radiation or pollutant present in a given environment that represents a potential health threat to living organisms.

Exposure Indicator: A characteristic of the environment measured to provide evidence of the occurrence or magnitude of a response indicator's exposure to a chemical or biological stress.

Extraction Procedure (E P Toxic): Determining toxicity by a procedure which simulates leaching; if a certain concentration of a toxic substance can be leached from a waste, that waste is considered hazardous, i.e., "E P Toxic."

Extremely Hazardous Substances: Any of 406 chemicals identified by EPA as toxic, and listed under SARA Title III. The list is subject to periodic revision.

F

Fabric Filter: A cloth device that catches dust particles from industrial emissions.

Facilities Plans: Plans and studies related to the construction of treatment works necessary to comply with the Clean Water Act or RCRA. A facilities plan investigates needs and provides information on the cost effectiveness of alternatives, a recommended plan, an environmental assessment of the recommendations, and descriptions of the treatment works, costs, and a completion schedule.

Facility Emergency Coordinator: Representative of a facility covered by environmental law (e.g. a chemical plant) who participates in the emergency reporting process with the Local Emergency Planning Committee (LEPC).

Feasibility Study: 1. Analysis of the practicability of a proposal; e.g., a description and analysis of potential cleanup alternatives for a site such as one on the National Priorities List. The feasibility study usually recommends selection of a cost-effective alternative. It usually starts as soon as the remedial investigation is underway; together, they are commonly referred to as the "RI/FS". 2. A small-scale investigation of a problem to ascertain whether a proposed research approach is likely to provide useful data.

Fecal Coliform Bacteria: Bacteria found in the intestinal tracts of mammals. Their presence in water or sludge is an indicator of pollution and possible contamination by pathogens.

Federal Implementation Plan: Under current law, a federally implemented plan to achieve attainment of air quality standards, used when a state is unable to develop an adequate plan.

Feedlot: A confined area for the controlled feeding of animals. Tends to concentrate large amounts of animal waste that cannot be absorbed by the soil and, hence, may be carried to nearby streams or lakes by rainfall runoff.

Fen: A type of wetland that accumulates peat deposits. Fens are less acidic than bogs, deriving most of their water from groundwater rich in calcium and magnesium. (See: wetlands.)

FIFRA Pesticide Ingredient: An ingredient of a pesticide that must be registered with EPA under the Federal Insecticide, Fungicide, and Rodenticide Act. Products making pesticide claims must register under FIFRA and may be subject to labeling and use requirements.

Filling: Depositing dirt, mud or other materials into aquatic areas to create more dry land, usually for agricultural or commercial development purposes, often with ruinous ecological consequences.

Filter Strip: Strip or area of vegetation used for removing sediment, organic matter, and other pollutants from runoff and waste water.

Filtration: A treatment process, under the control of qualified operators, for removing solid (particulate) matter from water by means of porous media such as sand or a man-made filter; often used to remove particles that containing pathogens.

Financial Assurance for Closure: Documentation or proof that an owner or operator of a facility such as a landfill or other waste repository is capable of paying the projected costs of closing the facility and monitoring it afterwards as provided in RCRA regulations.

Finding of No Significant Impact: A document prepared by a federal agency showing why a proposed action would not have a significant impact on the environment and thus would not require preparation of an Environmental Impact Statement. An FNSI is based on the results of an environmental assessment.

First Draw: The water that comes out when a tap is first opened, likely to have the highest level of lead contamination from plumbing materials.

Flare: A control device that burns hazardous materials to prevent their release into the environment; may operate continuously or intermittently, usually on top a stack.

Floc: A clump of solids formed in sewage by biological or chemical action.

Flocculation: Process by which clumps of solids in water or sewage aggregate through biological or chemical action so they can be separated from water or sewage.

Floor Sweep: Capture of heavier-than-air gases that collect at floor level.

Flow Rate: The rate, expressed in gallons-or liters-per-hour, at which a fluid escapes from a hole or fissure in a tank. Such measurements are also made of liquid waste, effluent, and surface water movement.

Flowmeter: A gauge indicating the velocity of wastewater moving through a treatment plant or of any liquid moving through various industrial processes.

Flue Gas Desulfurization: A technology that employs a sorbent, usually lime or limestone, to remove sulfur dioxide from the gases produced by burning fossil fuels. Flue gas desulfurization is current state-of-the-art technology for major SO₂ emitters, like power plants.

Flue Gas: The air coming out of a chimney after combustion in the burner it is venting. It can include nitrogen oxides, carbon oxides, water vapor, sulfur oxides, particles and many chemical pollutants.

Fluidized Bed Incinerator: An incinerator that uses a bed of hot sand or other granular material to transfer heat directly to waste. Used mainly for destroying municipal sludge.

Flume: A natural or man-made channel that diverts water.

Fluorides: Gaseous, solid, or dissolved compounds containing fluorine that result from industrial processes. Excessive amounts in food can lead to fluorosis.

Fluorocarbons (FCs): Any of a number of organic compounds analogous to hydrocarbons in which one or more hydrogen atoms are replaced by fluorine. Once used in the United States as a propellant for domestic aerosols, they are now found mainly in coolants and some industrial processes. FCs containing chlorine are called chlorofluorocarbons (CFCs). They are believed to be modifying the ozone layer in the stratosphere, thereby allowing more harmful solar radiation to reach the Earth's surface.

Flush: 1. To open a cold-water tap to clear out all the water which may have been sitting for a long time in the pipes. In new homes, to flush a system means to send large volumes of water gushing through the unused pipes to remove loose particles of solder and flux. 2. To force large amounts of water through liquid to clean out piping or tubing, storage or process tanks.

Fly Ash: Non-combustible residual particles expelled by flue gas.

Fogging: Applying a pesticide by rapidly heating the liquid chemical so that it forms very fine droplets that resemble smoke or fog. Used to destroy mosquitoes, black flies, and similar pests.

Food Chain: A sequence of organisms, each of which uses the next, lower member of the sequence as a food source.

Formaldehyde: A colorless, pungent, and irritating gas, CH₂O, used chiefly as a disinfectant and preservative and in synthesizing other compounds like resins.

Formulation: The substances comprising all active and inert ingredients in a pesticide.

Fresh Water: Water that generally contains less than 1,000 milligrams-per-liter of dissolved solids,

Friable Asbestos: Any material containing more than one percent asbestos, and that can be crumbled or reduced to powder by hand pressure. (May include previously non-friable material which becomes broken or damaged by mechanical force.)

Friable: Capable of being crumbled, pulverized, or reduced to powder by hand pressure.

Fuel Economy Standard: The Corporate Average Fuel Economy Standard (CAFE) effective in 1978. It enhanced the national fuel conservation effort imposing a miles-per-gallon floor for motor vehicles.

Fugitive Emissions: Emissions not caught by a capture system.

Fume: Tiny particles trapped in vapor in a gas stream.

Fumigant: A pesticide vaporized to kill pests. Used in buildings and greenhouses.

Functional Equivalent: Term used to describe EPA's decision-making process and its relationship to the environmental review conducted under the National Environmental Policy Act (NEPA). A review is considered functionally equivalent when it addresses the substantive components of a NEPA review.

Fungi: (Singular: Fungus) Molds, mildews, yeasts, mushrooms, and puffballs, a group of organisms lacking in chlorophyll (i.e., are not photosynthetic) and which are usually non-mobile, filamentous, and multicellular. Some grow in soil, others attach themselves to decaying trees and other plants whence they obtain nutrients. Some are pathogens, others stabilize sewage and digest composted waste.

Fungicide: Pesticides which are used to control, deter, or destroy fungi.

Fungistat: A chemical that keeps fungi from growing.

Furrow Irrigation: Irrigation method in which water travels through the field by means of small channels between each row or groups of rows.

Future Liability: Refers to potentially responsible parties' obligations to pay for additional response activities beyond those specified in the Record of Decision or Consent Decree.

G

Game Fish: Species like trout, salmon, or bass, caught for sport. Many of them show more sensitivity to environmental change than "rough" fish.

Garbage: Animal and vegetable waste resulting from the handling, storage, sale, preparation, cooking, and serving of foods.

Gas Chromatograph/Mass Spectrometer: Highly sophisticated instrument that identifies the molecular composition and concentrations of various chemicals in water and soil samples.

Gasification: Conversion of solid material such as coal into a gas for use as a fuel.

Gasoline Volatility: The property of gasoline whereby it evaporates into a vapor. Gasoline vapor is a volatile organic compound.

General Permit: A permit applicable to a class or category of dischargers.

General Reporting Facility: A facility having one or more hazardous chemicals above the 10,000 pound threshold for planning quantities. Such facilities must file MSDS and emergency inventory information with the SERC and LEPC and local fire departments.

Generator: 1. A facility or mobile source that emits pollutants into the air or releases hazardous waste into water or soil. 2. Any person, by site, whose act or process produces regulated medical waste or whose act first causes such waste to become subject to regulation. In a case where more than one person (e.g., doctors with separate medical practices) is located in the same building, each business entity is a separate generator.

Genetic Engineering: A process of inserting new genetic information into existing cells in order to modify any organism for the purpose of changing one of its characteristics.

Geographic Information System (GIS): A computer system designed for storing, manipulating, analyzing, and displaying data in a geographic context.

Germicide: Any compound that kills disease-causing microorganisms.

Glovebag: A polyethylene or polyvinyl chloride bag-like enclosure affixed around an asbestos-containing source (most often thermal system insulation) permitting the material to be removed while minimizing release of airborne fibers in the surrounding atmosphere.

Grain Loading: The rate at which particles are emitted from a pollution source. Measurement is made by the number of grains per cubic foot of gas emitted.

Granular Activated Carbon Treatment: A filtering system often used in small water systems and individual homes to remove organics. GAC can be highly effective in removing elevated levels of radon from water.

Grassed Waterway: Natural or constructed watercourse or outlet that is shaped or graded and established in suitable vegetation for the disposal of runoff water without erosion.

Gray Water: Domestic wastewater composed of wash water from kitchen, bathroom, and laundry sinks, tubs, and washers.

Greenhouse Effect: The warming of the Earth's atmosphere attributed to a build-up of carbon dioxide or other gases; some scientists think that this build-up allows the sun's rays to heat the Earth, while infra-red radiation makes the atmosphere opaque to a counterbalancing loss of heat.

Grinder Pump: A mechanical device that shreds solids and raises sewage to a higher elevation through pressure sewers.

Ground Cover: Plants grown to keep soil from eroding.

Ground Water: The supply of fresh water found beneath the Earth's surface, usually in aquifers, which supply wells and springs. Because ground water is a major source of drinking water, there is growing concern over contamination from leaching agricultural or industrial pollutants or leaking underground storage tanks.

Ground-Water Discharge: Ground water entering near coastal waters which has been contaminated by landfill leachate, deep well injection of hazardous wastes, septic tanks, etc.

Gully Erosion: Severe erosion in which trenches are cut to a depth greater than 30 centimeters (a foot). Generally, ditches deep enough to cross with farm equipment are considered gullies.

H

Habitat: The place where a population (e.g., human, animal, plant, microorganism) lives and its surroundings, both living and non-living.

Habitat Indicator: A physical attribute of the environment measured to characterize conditions necessary to support an organism, population, or community in the absence of pollutants, e.g., salinity of estuarine waters or substrate type in streams or lakes.

Half-Life: 1. The time required for a pollutant to lose half its effect on the environment. For example, the biochemical half-life of DDT in the environment is 15 years of Radium. 1,580 years. 2. The time required for half of the atoms of a radioactive element to undergo self-transmutation or decay. 3. The time required for the elimination of one half a total dose from the body.

Halon: Bromine-containing compounds with long atmospheric lifetimes whose breakdown in the stratosphere causes depletion of ozone. Halons are used in fire-fighting.

Hammermill: A high-speed machine that uses hammers and cutters to crush, grind, chip, or shred solid waste.

Hard Water: Alkaline water containing dissolved salts that interfere with some industrial processes and prevent soap from sudsing.

Hauler: Garbage collection company that offers complete refuse removal service; many also will also collect recyclables.

Hazard Communication Standard: An OSHA regulation that requires chemical manufacturers, suppliers, and importers to assess the hazards of the chemicals that they make, supply, or import, and to inform employers, customers, and workers of these hazards through MSDS sheets.

Hazardous Air Pollutants: Air pollutants which are not covered by ambient air quality standards but which, as defined in the Clean Air Act, may reasonably be expected to cause or contribute to irreversible illness or death. Such pollutants include asbestos, beryllium, mercury, benzene, coke oven emissions, radionuclides, and vinyl chloride.

Hazardous Chemical: An EPA designation for any hazardous material requiring an MSDS under OSHA's Hazard Communication Standard. Such substances are capable of producing fires and explosions or adverse health effects like cancer and dermatitis. Hazardous chemicals are distinct from hazardous waste. (See: Hazardous Waste.)

Hazardous Ranking System: The principle screening tool used by EPA to evaluate risks to public health and the environment associated with abandoned or uncontrolled hazardous waste sites. The HRS calculates a score based on the potential of hazardous substances spreading from the site through the air, surface water, or ground water, and on other factors such as density and proximity of human population. This score is the primary factor in deciding if the site should be on the National Priorities List and, if so, what ranking it should have compared to other sites on the list.

Hazardous Substance: 1. Any material that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive. 2. Any substance designated by EPA to be reported if a designated quantity of the substance is spilled in the waters of the United States or if otherwise released into the environment.

Hazardous Waste: By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Hazardous Waste Landfill: An excavated or engineered site where hazardous waste is deposited and covered.

Hazards Analysis: Procedures used to (1) identify potential sources of release of hazardous materials from fixed facilities or transportation accidents; (2) determine the vulnerability of a geographical area to a release of hazardous materials; and (3) compare hazards to determine which present greater or lesser risks to a community.

Hazards Identification: Providing information on which facilities have extremely hazardous substances, what those chemicals are, how much there is at each facility, how the chemicals are stored, and whether they are used at high temperatures.

Health Assessment: An evaluation of available data on existing or potential risks to human health posed by a Superfund site. The Agency for Toxic Substances and Disease Registry (ATSDR) of the Department of Health and Human Services (DHHS) is required to perform such an assessment at every site on the National Priorities List.

Heat Island Effect: A "dome" of elevated temperatures over an urban area caused by structural and pavement heat fluxes, and pollutant emissions.

Heavy Metals: Metallic elements with high atomic weights, e.g., mercury, chromium, cadmium, arsenic, and lead; can damage living things at low concentrations and tend to accumulate in the food chain.

Heptachlor: An insecticide that was banned on some food products in 1975 and all of them 1978. It was allowed for use in seed treatment until 1983. More recently it was found in milk and other dairy products in Arkansas and Missouri where dairy cattle were illegally fed treated seed.

Herbicide: A chemical pesticide designed to control or destroy plants, weeds, or grasses.

Herbivore: An animal that feeds on plants.

Heterotrophic Organisms: Species that are dependent on organic matter for food.

High-Density Polyethylene: A material used to make plastic bottles and other products that produces toxic fumes when burned.

High-Level Radioactive Waste (HLW): Waste generated in core fuel of a nuclear reactor, found at nuclear reactors or by nuclear fuel reprocessing; is a serious threat to anyone who comes near the waste without shielding. (See: low-level radioactive waste.)

High-Level Nuclear Waste Facility: Plant designed to handle disposal of used nuclear fuel, high-level radioactive waste, and plutonium waste.

Holding Pond: A pond or reservoir, usually made of earth, built to store polluted runoff.

Homeowner Water System: Any water system which supplies piped water to a single residence.

Homogeneous Area: In accordance with Asbestos Hazard and Emergency Response Act (AHERA) definitions, an area of surfacing materials, thermal surface insulation, or miscellaneous material that is uniform in color and texture.

Hood Capture Efficiency: Ratio of the emissions captured by a hood and directed into a control or disposal device, expressed as a percent of all emissions.

Host: 1. In genetics, the organism, typically a bacterium, into which a gene from another organism is transplanted. 2. In medicine, an animal infected or parasitized by another organism.

Household Waste (Domestic Waste): Solid waste, composed of garbage and rubbish, which normally originated in a private home or apartment house. Domestic waste may contain a significant amount of toxic or hazardous waste.

Hydraulic Gradient: In general, the direction of groundwater flow due to changes in the depth of the water table.

Hydrocarbons (HC): Chemical compounds that consist entirely of carbon and hydrogen.

Hydrogen Sulfide (HS): Gas emitted during organic decomposition. Also a by-product of oil refining and burning. Smells like rotten eggs and, in heavy concentration, can kill or cause illness.

Hydrogeology: The geology of ground water, with particular emphasis on the chemistry and movement of water.

Hydrology: The science dealing with the properties, distribution, and circulation of water.

Hypolimnion: Bottom waters of a thermally stratified lake. The hypolimnion of a eutrophic lake is usually low or lacking in oxygen.

Identification Code or EPA I.D. Number: The unique code assigned to each generator, transporter, and treatment, storage, or disposal facility by regulating agencies to facilitate identification and tracking of chemicals or hazardous waste.

Ignitable: Capable of burning or causing a fire.

Immediately Dangerous to Life and Health (IDLH): The maximum level to which a healthy individual can be exposed to a chemical for 30 minutes and escape without suffering irreversible health effects or impairing symptoms. Used as a "level of concern." (See: level of concern.)

Impoundment: A body of water or sludge confined by a dam, dike, floodgate, or other barrier.

Incident Command Post: A facility located at a safe distance from an emergency site, where the incident commander, key staff, and technical representatives can make decisions and deploy emergency manpower and equipment.

Incident Command System (ICS): The organizational arrangement wherein one person, normally the Fire Chief of the impacted district, is in charge of an integrated, comprehensive emergency response organization and the emergency incident site, backed by an Emergency Operations Center staff with resources, information and advice.

Incineration: A treatment technology involving destruction of waste by controlled burning at high temperatures, e.g., burning sludge to remove the water and reduce the remaining residues to a safe, non-burnable ash that can be disposed of safely on land, in some waters, or in underground locations.

Incineration at Sea: Disposal of waste by burning at sea on specially-designed incinerator ships.

Incinerator: A furnace for burning waste under controlled conditions.

Incompatible Waste: A waste unsuitable for mixing with another waste or material because it may react to form a hazard.

Indicator: In biology, an organism, species, or community whose characteristics show the presence of specific environmental conditions, good or bad.

Indirect Discharge: Introduction of pollutants from a non-domestic source into a publicly owned waste-treatment system. Indirect dischargers can be commercial or industrial facilities whose wastes enter local sewers.

Indoor Air: The breathing air inside a habitable structure or conveyance.

Indoor Air Pollution: Chemical, physical, or biological contaminants in indoor air.

Indoor Climate: Temperature, humidity, lighting, and noise levels in a habitable structure or conveyance. Indoor climate can affect indoor air pollution.

Industrial Pollution Prevention: Combination of industrial source reduction and toxic chemical use substitution

Industrial Source Reduction: Practices that reduce the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment; Also reduces the threat to public health and the environment associated with such releases. Term includes equipment or technology modifications, substitution of raw materials, and improvements in housekeeping, maintenance, training or inventory control.

Industrial Waste: Unwanted materials from an industrial operation; may be liquid, sludge, solid, or hazardous waste.

Inert Ingredient: Pesticide components such as solvents, carriers, dispersants, and surfactants that are not active against target pests. Not all inert ingredients are innocuous.

Inertial Separator: A device that uses centrifugal force to separate waste particles.

Infectious Agent: Any organism, such as a virus or bacterium, that is pathogenic and capable of being communicated by invasion and multiplication in body tissues.

Infectious Waste: Hazardous waste with infectious characteristics, including: contaminated animal waste; human blood and blood products; isolation waste, pathological waste; and discarded sharps (needles, scalpels or broken medical instruments.)

Infiltration: 1. The penetration of water through the ground surface into sub-surface soil or the penetration of water from the soil into sewer or other pipes through defective joints, connections, or manhole walls. 2. The technique of applying large volumes of waste water to land to penetrate the surface and percolate through the underlying soil. (See: percolation.)

Infiltration Rate: The quantity of water than can enter the soil in a specified time interval.

Inflow: Entry of extraneous rain water into a sewer system from sources other than infiltration, such as basement drains, manholes, storm drains, and street washing.

Influent: Water, wastewater, or other liquid flowing into a reservoir, basin, or treatment plant.

Information File: In the Superfund program, a file that contains accurate, up-to-date documents on a Superfund site. The file is usually located in a public building (school, library, or city hall) convenient for local residents.

Injection Well: A well into which fluids are injected for purposes such as waste disposal, improving the recovery of crude oil, or solution mining.

Injection Zone: A geological formation receiving fluids through a well.

Innovative Technologies: New or inventive methods to treat effectively hazardous waste and reduce risks to human health and the environment.

Inoculum: 1. Bacterium placed in compost to start biological action. 2. A medium containing organisms that is introduced into cultures or living organisms.

Inorganic Chemicals: Chemical substances of mineral origin, not of basically carbon structure.

Insecticide: A pesticide compound specifically used to kill or prevent the growth of insects.

Inspection and Maintenance (I/M): 1. Activities to assure that vehicles' emissions-controls work properly. 2. Also applies to wastewater treatment plants and other anti-pollution facilities and processes.

Instream Use: Water use taking place within a stream channel, e.g., hydro-electric power generation, navigation, water quality improvement, fish propagation, recreation.

In-Situ Stripping: Treatment system that remove or "strips" volatile organic compounds from contaminated ground or surface water by forcing an airstream through the water and causing the compounds to evaporate.

Integrated Pest Management (IPM): A mixture of chemical and other, non-pesticide, methods to control pests.

Integrated Waste Management: Using a variety of practices to handle municipal solid waste; can include source reduction, recycling, incineration, and landfilling.

Interceptor Sewers: Large sewer lines that, in a combined system, control the flow of sewage to the treatment plant. In a storm, they allow some of the sewage to flow directly into a receiving stream, thus keeping it from overflowing onto the streets. Also used in separate systems to collect the flows from main and trunk sewers and carry them to treatment points.

Interim (Permit) Status: Period during which treatment, storage and disposal facilities coming under RCRA in 1980 are temporarily permitted to operate while awaiting a permanent permit. Permits issued under these circumstances are usually called "Part A" or "Part B" permits.

Interstate Carrier Water Supply: A source of water for drinking and sanitary use on planes, buses, trains, and ships operating in more than one state. These sources are federally regulated.

Interstate Commerce Clause: A clause of the U.S. Constitution which reserves to the federal government the right to regulate the conduct of business across state lines. Under this clause, for example, the U.S. Supreme Court has ruled that states may not inequitably restrict the disposal out-of-state wastes in their jurisdictions.

Interstate Waters: Waters that flow across or form part of state or international boundaries, e.g., the Great Lakes, the Mississippi River, or coastal waters.

Interstitial Monitoring: The continuous surveillance of the space between the walls of an underground storage tank.

Inventory (TSCA): Inventory of chemicals produced pursuant to Section 8 (b) of the Toxic Substances Control Act.

Inversion: A layer of warm air preventing the rise of cooling air and pollutants trapped beneath it. Can cause an air pollution episode.

Ion: An electrically charged atom that can be drawn from waste water during electro-dialysis.

Ion Exchange Treatment: A common water-softening method often found on a large scale at water purification plants that remove some organics and radium by adding calcium oxide or calcium hydroxide to increase the pH to a level where the metals will precipitate out.

Ionization Chamber: A device that measures the intensity of ionizing radiation.

Ionizing Radiation: Radiation that can strip electrons from atoms, i.e., alpha, beta, and gamma radiation.

Irradiated Food: Food subject to brief radioactivity, usually gamma rays, to kill insects, bacteria, and mold, and to permit storage without refrigeration.

Irradiation: Exposure to radiation of wavelengths shorter than those of visible light (gamma, x-ray, or ultraviolet), for medical purposes, to sterilize milk or other foodstuffs, or to induce polymerization of monomers or vulcanization of rubber.

Irrigation: Applying water or wastewater to land areas to supply the water and nutrient needs of plants.

Irrigation Efficiency: The amount of water stored in the crop root zone compared to the amount of irrigation water applied.

Irrigation Return Flow: Surface and sub-surface water which leaves the field following application of irrigation water.

Irritant: A substance that can cause irritation of the skin, eyes, or respiratory system. Effects may be acute from a single high level exposure, or chronic from repeated low-level exposures to such compounds as chlorine, nitrogen dioxide, and nitric acid.

Isotope: A variation of an element that has the same atomic number of protons but a different weight because of the number of neutrons. Various isotopes of the same element may have different radioactive behaviors, some are highly unstable.

K

Karst: A geologic formation of irregular limestone deposits with sinks, underground streams, and caverns.

Kinetic Rate Coefficient: A number that describes the rate at which a water constituent such as a biochemical oxygen demand or dissolved oxygen rises or falls.

L

Lagoon: 1. A shallow pond where sunlight, bacterial action, and oxygen work to purify wastewater; also used for storage of wastewater or spent nuclear fuel rods. 2. Shallow body of water, often separated from the sea by coral reefs or sandbars.

Land Application: Discharge of wastewater onto the ground for treatment or reuse. (See: irrigation.)

Land Ban: Phasing out of land disposal of most untreated hazardous wastes, as mandated by the 1984 RCRA amendments.

Land Farming (of waste): A disposal process in which hazardous waste deposited on or in the soil is degraded naturally by microbes.

Landfills: 1. Sanitary landfills are disposal sites for non-hazardous solid wastes spread in layers, compacted to the smallest practical volume, and covered by material applied at the end of each operating day. 2. Secure chemical landfills are disposal sites for hazardous waste, selected and designed to minimize the chance of release of hazardous substances into the environment.

Landscape: The traits, patterns, and structure of a specific geographic area, including its biological composition, its physical environment, and its anthropogenic or social patterns. An area where interacting ecosystems are grouped and repeated in similar form.

Landscape Characterization: Documentation of the traits and patterns of the essential elements of the landscape.

Landscape Ecology: The study of the distribution patterns of communities and ecosystems, the ecological processes that affect those patterns, and changes in pattern and process over time.

Landscape Indicator: A measurement of the landscape, calculated from mapped or remotely sensed data, used to describe spatial patterns of land use and land cover across a geographic area. Landscape indicators may be useful as measures of certain

kinds of environmental degradation such as forest fragmentation.

Large Quantity Generator: Person or facility generating more than 2200 pounds of hazardous waste per month. Such generators produce about 90 percent of the nation's hazardous waste, and are subject to all RCRA requirements.

Lateral Sewers: Pipes that run under city streets and receive the sewage from homes and businesses, as opposed to domestic feeders and main trunk lines.

LC50/Lethal Concentration: Median level concentration, a standard measure of toxicity. It tells how much of a substance is needed to kill half of a group of experimental organisms in a given time. (See: LD50.)

LD 50/Lethal Dose: The dose of a toxicant that will kill 50 percent of the test organisms within a designated period. The lower the LD 50, the more toxic the compound.

Leachate: Water that collects contaminants as it trickles through wastes, pesticides or fertilizers. Leaching may occur in farming areas, feedlots, and landfills, and may result in hazardous substances entering surface water, ground water, or soil.

Leachate Collection System: A system that gathers leachate and pumps it to the surface for treatment.

Leaching: The process by which soluble constituents are dissolved and filtered through the soil by a percolating fluid. (See: leachate.)

Lead (Pb): A heavy metal that is hazardous to health if breathed or swallowed. Its use in gasoline, paints, and plumbing compounds has been sharply restricted or eliminated by federal laws and regulations. (See: heavy metals.)

Level of Concern (LOC): The concentration in air of an extremely hazardous substance above which there may be serious immediate health effects to anyone exposed to it for short periods. **Lift:** In a sanitary landfill, a compacted layer of solid waste and the top layer of cover material.

Lifting Station: (See: pumping station.)

Limestone Scrubbing: Use of a limestone and water solution to remove gaseous stack-pipe sulfur before it reaches the atmosphere.

Limited Degradation: An environmental policy permitting some degradation of natural systems but terminating at a level well beneath an established health standard.

Limiting Factor: A condition whose absence or excessive concentration, is incompatible with the needs or tolerance of a species or population and which may have a negative influence on their ability to thrive survive.

Limnology: The study of the physical, chemical, hydrological, and biological aspects of fresh water bodies.

Liner: 1. A relatively impermeable barrier designed to keep leachate inside a landfill. Liner materials include plastic and dense clay. 2. An insert or sleeve for sewer pipes to prevent leakage or infiltration.

Lipid Solubility: The maximum concentration of a chemical that will dissolve in fatty substances. Lipid soluble substances are insoluble in water. They will very selectively disperse through the environment via uptake in living tissue.

Liquefaction: Changing a solid into a liquid.

Liquid Injection Incinerator: Commonly used system that uses high pressure to prepare liquid wastes for incineration breaking them up into tiny droplets to allow easier combustion.

List: Shorthand term for EPA list of violating facilities or firms debarred from obtaining government contracts because they violated certain sections of the Clean Air or Clean Water Acts. The list is maintained by The Office of Enforcement and Compliance Monitoring.

Listed Waste: Wastes listed as hazardous under RCRA but which have not been subjected to the Toxic Characteristics Listing Process because the dangers they present are considered self-evident.

Litter: The highly visible portion of solid waste carelessly discarded outside the regular garbage and trash collection and disposal system.

Local Education Agency (LEA): In the asbestos program, an educational agency at the local level that exists primarily to operate schools or to contract for educational services, including primary and secondary public and private schools. A single, unaffiliated school can be considered an LEA for AHERA purposes.

Local Emergency Planning Committee (LEPC): A committee appointed by the state emergency response commission, as required by SARA Title III, to formulate a comprehensive emergency plan for its jurisdiction.

Low NO_x Burners: One of several combustion technologies used to reduce emissions of Nitrogen Oxides (NO_x).

Low-Level Radioactive Waste (LLRW): Wastes less hazardous than most of those associated with nuclear reactor; generated by hospitals, research laboratories, and certain industries. The Department of Energy, Nuclear Regulatory Commission, and EPA share responsibilities for managing them. (See: high-level radioactive wastes.)

Lower Explosive Limit (LEL): The concentration of a compound in air below which the mixture will not catch on fire.

Lowest Achievable Emission Rate: Under the Clean Air Act, the rate of emissions that reflects (a) the most stringent emission limitation in the implementation plan of any state for such source unless the owner or operator demonstrates such limitations are not achievable; or (b) the most stringent emissions limitation achieved in practice, whichever is more stringent. A proposed new or modified source may not emit pollutants in excess of existing new source standards.

M

Magnetic Separation: Use of magnets to separate ferrous materials from mixed municipal waste stream.

Mandatory Recycling: Programs which by law require consumers to separate trash so that some or all recyclable materials are recovered for recycling rather than going to landfills.

Manual Separation: Hand sorting of recyclable or compostable materials in waste.

Major Modification: This term is used to define modifications of major stationary sources of emissions with respect to Prevention of Significant Deterioration and New Source Review under the Clean Air Act.

Major Stationary Sources: Term used to determine the applicability of Prevention of Significant Deterioration and new source regulations. In a nonattainment area, any stationary pollutant source with potential to emit more than 100 tons per year is considered a major stationary source. In PSD areas the cutoff level may be either 100 or 250 tons, depending upon the source.

Majors: Larger publicly owned treatment works (POTWs) with flows equal to at least one million gallons per day (mgd) or servicing population equivalent to 10,000 persons; certain other POTWs having significant water quality impacts. (See: minors.)

Management Plan: Under the Asbestos Hazard Emergency Response Act (AHERA), a document that each Local Education Agency is required to prepare, describing all activities planned and undertaken by a school to comply with AHERA regulations, including building inspections to identify asbestos-containing materials, response actions, and operations and maintenance programs to minimize the risk of exposure.

Manifest System: Tracking of hazardous waste from "cradle to grave" (generation through disposal) with accompanying documents known as manifests. (See: Cradle to Grave.)

Manual Separation: Hand separation of compostable or recyclable material from waste.

Manufacturers Formulation: A list of substances or component parts as described by the maker of a coating, pesticide, or other product containing chemicals or other substances.

Marine Sanitation Device: Any equipment or process installed on board a vessel to receive, retain, treat, or discharge sewage.

Marsh: A type of wetland that does not accumulate appreciable peat deposits and is dominated by herbaceous vegetation. Marshes may be either fresh or saltwater, tidal or non-tidal. (See: wetlands.)

Material Category: In the asbestos program, broad classification of materials into thermal surfacing insulation, surfacing material, and miscellaneous material.

Materials Recovery Facility: A facility that processes residentially collected mixed recyclables into new products available for market.

Material Type is classification of suspect material by its specific use or application, e.g., pipe insulation, fireproofing, and floor tile.

Material Safety Data Sheet (MSDS): A compilation of information required under the OSHA Communication Standard on the identity of hazardous chemicals, health, and physical hazards, exposure limits, and precautions. Section 311 of SARA requires facilities to submit MSDSs under certain circumstances.

Materials Recovery Facility (MRF): Facility that processes residentially collected mixed recyclables into new products.

Maximum Contaminant Level: The maximum permissible level of a contaminant in water delivered to any user of a public system. MCLs are enforceable standards.

Maximum Contaminant Level Goal (MCLG): Under the Safe Drinking Water Act, a non-enforceable concentration of a drinking water contaminant, set at the level at which no known or anticipated adverse effects on human health occur and which allows an adequate safety margin. The MCLG is usually the starting point for determining the regulated Maximum Contaminant Level. (See: Maximum Contaminant Level.)

Mechanical Aeration: Use of mechanical energy to inject air into water to cause a waste stream to absorb oxygen.

Mechanical Separation: Using mechanical means to separate waste into various components.

Mechanical Turbulence: Random irregularities of fluid motion in air caused by buildings or other non-thermal processes.

Media: Specific environments—air, water, soil—which are the subject of regulatory concern and activities.

Medical Surveillance: A periodic comprehensive review of a worker's health status; acceptable elements of such surveillance program are listed in the Occupational Safety and Health Administration standards for asbestos.

Medical Waste: Any solid waste generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals, excluding hazardous waste identified or listed under 40 CFR Part 261 or any household waste as defined in 40 CFR Sub-section 261.4 (b)(1).

Mercury: A heavy metal that can accumulate in the environment and is highly toxic if breathed or swallowed. (See: heavy metals.)

Metabolites: Any substances produced by biological processes, such as those from pesticides.

Methane: A colorless, nonpoisonous, flammable gas created by anaerobic decomposition of organic compounds.

Method 18: An EPA test method which uses gas chromatographic techniques to measure the concentration of volatile organic compounds in a gas stream.

Method 24: An EPA reference method to determine density, water content and total volatile content (water and VOC) of coatings.

Method 25: An EPA reference method to determine the VOC concentration in a gas stream.

Microclimate: The localized climate conditions within an urban area or neighborhood.

Microbial Pesticide: A microorganism that is used to control a pest, but of minimum toxicity to man.

Million-gallons Per Day (MGD): A measure of water flow.

Minimization: A comprehensive program to minimize or eliminate wastes, usually applied to wastes at their point of origin. (See: waste minimization.)

Minors: Publicly owned treatment works with flows less than 1 million gallons per day. (See: majors.)

Miscellaneous ACM: Interior asbestos-containing building material or structural components, members or fixtures, such as floor and ceiling tiles; does not include surfacing materials or thermal system insulation.

Miscellaneous materials: Interior building materials on structural components, such as floor or ceiling tiles.

Miscible Liquids: Two or more liquids that can be mixed and will remain mixed under normal conditions.

Missed Detection: The situation that occurs when a test indicates that a tank is "tight" when in fact it is leaking.

Mist: Liquid particles measuring 40 to 500 microns, are formed by condensation of vapor. By comparison, fog particles are smaller than 40 microns.

Mitigation: Measures taken to reduce adverse impacts on the environment.

Mixed Funding: Settlements in which potentially responsible parties and EPA share the cost of a response action.

Mixed Liquor: A mixture of activated sludge and water containing organic matter undergoing activated sludge treatment in an aeration tank.

Mobile Incinerator Systems: Hazardous waste incinerators that can be transported from one site to another.

Mobile Source: Any non-stationary source of air pollution such as cars, trucks, motorcycles, buses, airplanes, locomotives.

Model Plant: A hypothetical plant design used for developing economic, environmental, and energy impact analyses as support for regulations or regulatory guidelines; first step in exploring the economic impact of a potential NSPS.

Molten Salt Reactor: A thermal treatment unit that rapidly heats waste in a heat-conducting fluid bath of carbonate salt.

Monitoring Well: 1. A well used to obtain water quality samples or measure groundwater levels. 2. Well drilled at a hazardous waste management facility or Superfund site to collect ground-water samples for the purpose of physical, chemical, or biological analysis to determine the amounts, types, and distribution of contaminants in the ground water beneath the site.

Monitoring: Periodic or continuous surveillance or testing to determine the level of compliance with statutory requirements and/or pollutant levels in various media or in humans, plants, and animals.

Monoclonal Antibodies: (Also called MABs and MCAs) 1. Man-made clones of a molecule, produced in quantity for medical or research purposes. 2. Molecules of living organisms that selectively find and attach to other molecules to which their structure conforms exactly. This could also apply to equivalent activity by chemical molecules.

Moratorium: During the negotiation process, a period of 60 to 90 days during which EPA and potentially responsible parties may reach settlement but no site response activities can be conducted.

Morbidity: Rate of disease incidence.

Muck Soils: Earth made from decaying plant materials.

Mulch: A layer of material (wood chips, straw, leaves, etc.) placed around plants to hold moisture, prevent weed growth, and enrich or sterilize the soil.

Multiple Use: Use of land for more than one purpose; i.e., grazing of livestock, watershed and wildlife protection, recreation, and timber production. Also applies to use of bodies of water for recreational purposes, fishing, and water supply.

Multistage Remote Sensing: A strategy for landscape characterization that involves gathering and analyzing information at several geographic scales, ranging from generalized levels of detail at the national level through high levels of detail at the local scale.

Municipal Discharge: Discharge of effluent from waste water treatment plants which receive waste water from households, commercial establishments, and industries in the coastal drainage basin. Combined sewer/separate storm overflows are included in this category.

N

National Ambient Air Quality Standards (NAAQS): Standards established by EPA that apply for outside air throughout the country. (See: criteria pollutants, state implementation plans, emissions trading.)

National Emissions Standards For Hazardous Air Pollutants (NESHAPS): Emissions standards set by EPA for an air pollutant not covered by NAAQS that may cause an increase in fatalities or in serious, irreversible, or incapacitating illness. Primary standards are designed to protect human health, secondary standards to protect public welfare (e.g., building facades, visibility, crops, and domestic animals).

National Estuary Program: A program established under the Clean Water Act Amendments of 1987 to develop and implement conservation and management plans for protecting estuaries and restoring and maintaining their chemical, physical, and biological integrity, as well as controlling point and nonpoint pollution sources.

National Municipal Plan: A policy created in 1984 by EPA and the states in 1984 to bring all publicly owned treatment works (POTWs) into compliance with Clean Water Act requirements.

National Oil and Hazardous Substances Contingency Plan (NOHSCP/NCP): The federal regulation that guides determination of the sites to be corrected under both the Superfund program and the program to prevent or control spills into surface waters or elsewhere.

National Pollutant Discharge Elimination System (NPDES): A provision of the Clean Water Act which prohibits discharge of pollutants into waters of the United States unless a special permit is issued by EPA, a state, or, where delegated, a tribal government on an Indian reservation.

National Priorities List (NPL): EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under Superfund. The list is based primarily on the score a site receives from the Hazard Ranking System. EPA is required to update the NPL at least once a year. A site must be on the NPL to receive money from the Trust Fund for remedial action.

National Response Team (NRT): Representatives of 13 federal agencies that, as a team, coordinate federal responses to nationally significant incidents of pollution—an oil spill, a major chemical release, or a Superfund response action—and provide advice and technical assistance to the responding agency(ies) before and during a response action.

National Response Center: The federal operations center that receives notifications of all releases of oil and hazardous substances into the environment; open 24 hours a day, is operated by the U.S. Coast Guard, which evaluates all reports and notifies the appropriate agency.

Navigable Waters: Traditionally, waters sufficiently deep and wide for navigation by all, or specified vessels; such waters in the United States come under federal jurisdiction and are protected by certain provisions of the Clean Water Act.

Necrosis: Death of plant or animal cells or tissues. In plants, necrosis can discolor stems or leaves or kill a plant entirely.

Negotiations: (Under Superfund) After potentially responsible parties are identified for a site, EPA coordinates with them to reach a settlement that will result in the PRP paying for or conducting the cleanup under EPA supervision. If negotiations fail, EPA can order the PRP to conduct the cleanup or EPA can pay for the cleanup using Superfund monies and then sue to recover the costs.

Nematocide: A chemical agent which is destructive to nematodes.

Neutralization: Decreasing the acidity or alkalinity of a substance by adding alkaline or acidic materials, respectively.

New Source Performance Standards (NSPS): Uniform national EPA air emission and water effluent standards which limit the amount of pollution allowed from new sources or from modified existing sources.

New Source: Any stationary source built or modified after publication of final or proposed regulations that prescribe a given standard of performance.

Nitrate: A compound containing nitrogen that can exist in the atmosphere or as a dissolved gas in water and which can have harmful effects on humans and animals. Nitrates in water can cause severe illness in infants and domestic animals.

Nitric Oxide (NO): A gas formed by combustion under high temperature and high pressure in an internal combustion engine; changes into nitrogen dioxide in the ambient air and contributes to photochemical smog.

Nitrification: The process whereby ammonia in wastewater is oxidized to nitrite and then to nitrate by bacterial or chemical reactions.

Nitrilotriacetic Acid (NTA): A compound now replacing phosphates in detergents:

Nitrite: 1. An intermediate in the process of nitrification. 2. Nitrous oxide salts used in food preservation

Nitrogen Dioxide (NO₂): The result of nitric oxide combining with oxygen in the atmosphere; major component of photochemical smog.

Nitrogen Oxide (NO_x): Product of combustion from transportation and stationary sources and a major contributor to the formation of ozone in the troposphere and to acid deposition.

Nitrogenous Wastes: Animal or vegetable residues that contain significant amounts of nitrogen.

Nitrophenols: Synthetic organopesticides containing carbon, hydrogen, nitrogen, and oxygen.

No Further Remedial Action Planned: Determination made by EPA following a preliminary assessment that a site does not pose a significant risk and so requires no further activity under CERCLA.

Noise: Product-level or product-volume changes occurring during a test that are not related to a leak but may be mistaken for one.

Non-Attainment Area: Area that does not meet one or more of the National Ambient Air Quality Standards for the criteria pollutants designated in the Clean Air Act.

Non-Binding Allocations of Responsibility (NBAR): Process for EPA to propose a way for potentially responsible parties to allocate costs among themselves.

Non-Community Water System: A public water system that is not a community water system, e.g., the water supply at a camp site or national park.

Non-Conventional Pollutant: Any pollutant not statutorily listed or which is poorly understood by the scientific community.

No Further Remedial Action Planned: Determination made by EPA following a preliminary assessment that a site does not pose a significant risk and so requires no further activity under CERCLA.

Non-Point Source: Diffuse pollution sources (i.e., without a single point of origin or not introduced into a receiving stream from a specific outlet). The pollutants are generally carried off the land by storm water. Common non-point sources are agriculture, forestry, urban, mining, construction, dams, channels, land disposal, saltwater intrusion, and city streets.

Non-Contact Cooling Water: Water used for cooling which does not come into direct contact with any raw material, product, byproduct, or waste.

Non-degradation: An environmental policy which disallows any lowering of naturally occurring quality regardless of established health standards.

Non-ionizing Electromagnetic Radiation: 1. Radiation that does not change the structure of atoms but does heat tissue and may cause harmful biological effects. 2. Microwaves, radio waves, and low-frequency electromagnetic fields from high-voltage transmission lines.

Nondischarging Treatment Plant: A treatment plant that does not discharge treated wastewater into any stream or river. Most are pond systems that dispose of the total flow they receive by means of evaporation or percolation to groundwater, or facilities that dispose of their effluent by recycling or reuse (e.g., spray irrigation or groundwater discharge).

Nonfriable Asbestos-containing Materials: Any material containing more than one percent asbestos (as determined by Polarized Light Microscopy) that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Non-Road Emissions: Pollutants emitted by combustion engines on farm and construction equipment, gasoline-powered lawn and garden equipment, and power boats and outboard motors.

Notice of Deficiency: An EPA request to a facility owner or operator requesting additional information before a preliminary decision on a permit application can be made.

Notice of Intent to Deny: Notification by EPA of its preliminary intent to deny a permit application.

No Till: Planting crops without prior seedbed preparation, into an existing cover crop, sod, or crop residues, and eliminating subsequent tillage operations.

Nuclear Reactors and Support Facilities: Uranium mills, commercial power reactors, fuel reprocessing plants, and uranium enrichment facilities.

Nuclear Winter: Prediction by some scientists that smoke and debris rising from massive fires of a nuclear war could block sunlight for weeks or months, cooling the earth's surface and producing climate changes that could, for example, negatively effect world agricultural and weather patterns.

Nutrient: Any substance assimilated by living things that promotes growth. The term is generally applied to nitrogen and phosphorus in wastewater, but is also applied to other essential and trace elements.

O

Ocean Discharge Waiver: A variance from Clean Water Act requirements for discharges into marine waters.

Off-Site Facility: A hazardous waste treatment, storage or disposal area that is located away from the generating site.

Oil Fingerprinting: A method that identifies sources of oil and allows spills to be traced to their source.

Oil Spill: An accidental or intentional discharge of oil which reaches bodies of water. Can be controlled by chemical dispersion, combustion, mechanical containment, and/or adsorption. Spills from tanks and pipelines can also occur away from water bodies, contaminating the soil, getting into sewer systems and threatening underground water sources.

Oligotrophic Lakes: Deep clear lakes with few nutrients, little organic matter and a high dissolved-oxygen level.

On-Scene Coordinator (OSC): The pre-designated EPA, Coast Guard, or Department of Defense official who coordinates and directs Superfund removal actions or Clean Water Act oil-or hazardous-spill response actions.

On-Site Facility: A hazardous waste treatment, storage or disposal area that is located on the generating site.

Onboard Controls: Devices placed on vehicles to capture gasoline vapor during refueling and route it to the engines when the vehicle is starting so that it can be efficiently burned.

Opacity: The amount of light obscured by particulate pollution in the air; clear window glass has zero opacity, a brick wall is 100 percent opaque. Opacity is an indicator of changes in performance of particulate control systems.

Open Burning: Uncontrolled fires in an open dump.

Open Dump: An uncovered site used for disposal of waste without environmental controls. (See: dump.)

Operable Unit: Term for each of a number of separate activities undertaken as part of a Superfund site cleanup. A typical operable unit would be removal of drums and tanks from the surface of a site.

Operating Conditions: Conditions specified in a RCRA permit that dictate how an incinerator must operate as it burns different waste types. A trial burn is used to identify operating conditions needed to meet specified performance standards.

Operation And Maintenance: 1. Activities conducted after a Superfund site action is completed to ensure that the action is effective. 2. Actions taken after construction to assure that facilities constructed to treat waste water will be properly operated and maintained to achieve normative efficiency levels and prescribed effluent limitations in an optimum manner. 3. Ongoing asbestos management plan in a school or other public building, including regular inspections, various methods of maintaining asbestos in place, and removal when necessary.

Oral Toxicity: Ability of a pesticide to cause injury when ingested.

Organic: 1. Referring to or derived from living organisms. 2. In chemistry, any compound containing carbon.

Organic Chemicals/Compounds: Animal or plant-produced substances containing mainly carbon, hydrogen, nitrogen, and oxygen.

Organic Matter: Carbonaceous waste contained in plant or animal matter and originating from domestic or industrial sources.

Organophosphates: Pesticides that contain phosphorus; short-lived, but some can be toxic when first applied.

Organotins: Chemical compounds used in anti-foulant paints to protect the hulls of boats and ships, buoys, and pilings from marine organisms such as barnacles.

Original AHERA Inspection/Original Inspection/Inspection: Examination of school buildings arranged by Local Education Agencies to identify asbestos-containing materials, evaluate their condition, take samples of materials suspected to contain asbestos; performed by EPA-accredited inspectors

Original Generation Point: Where regulated medical or other material first becomes waste.

Outfall: The place where effluent is discharged into receiving waters.

Overburden: Rock and soil cleared away before mining.

Overfire Air: Air forced into the top of an incinerator or boiler to fan the flames.

Overland Flow: A land application technique that cleanses waste water by allowing it to flow over a sloped surface. As the water flows over the surface, contaminants are absorbed and the water is collected at the bottom of the slope for reuse.

Oversized Regulated Medical Waste: Medical waste that is too large for plastic bags or standard containers.

Overturn: One complete cycle of top to bottom mixing of previously stratified water masses. This phenomenon may occur in spring or fall, or after storms, and results in uniformity of chemical and physical properties of water at all depths.

Oxidant: A substance containing oxygen that reacts chemically in air to produce a new substance; the primary ingredient of photochemical smog.

Oxidation: The addition of oxygen that breaks down organic waste or chemicals such as cyanides, phenols, and organic sulfur compounds in sewage by bacterial and chemical means.

Oxidation Pond: A man-made body of water in which waste is consumed by bacteria, used most frequently with other waste-treatment processes; a sewage lagoon.

Oxygenated Fuels: Gasoline which has been blended with alcohols or ethers that contain oxygen in order to reduce carbon monoxide and other emissions.

Oxygenated Solvent: An organic solvent containing oxygen as part of the molecular structure. Alcohols and ketones are oxygenated compounds often used as paint solvents.

Ozone (O³): Found in two layers of the atmosphere, the stratosphere and the troposphere. In the *stratosphere* (the atmospheric layer 7 to 10 miles or more above the earth's surface) ozone is a natural form of oxygen that provides a protective layer shielding the earth from ultraviolet radiation. In the *troposphere* (the layer extending up 7 to 10 miles from the earth's surface), ozone is a chemical oxidant and major component of photochemical smog. It can seriously impair the respiratory system and is one of the most widespread of all the criteria pollutants for which the Clean Air Act required EPA to set standards. Ozone in the troposphere is produced through complex chemical reactions of nitrogen oxides, which are among the primary pollutants emitted by combustion sources; hydrocarbons, released into the atmosphere through the combustion, handling and processing of petroleum products; and sunlight.

Ozonator: A device that adds ozone to water.

Ozone Depletion: Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or-bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.

Ozone Hole: Thinning break in the stratospheric ozone layer. Designation of amount of such depletion as a "ozone hole" is made when detected amount of depletion exceeds fifty percent. Seasonal ozone holes have been observed over both the Antarctic region and the Arctic region and part of Canada and the extreme northeastern United States.

P

Packaging: The assembly of one or more containers and any other components necessary to assure minimum compliance with a program's storage and shipment packaging requirements. Also, the containers, etc., involved.

Packed Bed Scrubber: An air pollution control device in which emissions pass through alkaline water to neutralize hydrogen chloride gas.

Packed Tower: A pollution control device that forces dirty air through a tower packed with crushed rock or wood chips while liquid is sprayed over the packing material. The pollutants in the air stream either dissolve or chemically react with the liquid.

Pandemic: A Widespread throughout an area, nation or the world.

Parameter: A variable, measurable property whose value is a determinant of the characteristics of a system; e.g., temperature, pressure, and density are parameters of the atmosphere.

Paraquat: A standard herbicide used to kill various types of crops, including marijuana.

Part A Permit, Part B Permit: (See: Interim Permit Status.)

Particulate Loading: The mass of particulates per unit volume of air or water.

Participation Rate: Portion of population participating in a recycling program.

Particulates: Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog, found in air or emissions.

Partition Coefficient: Measure of the sorption phenomenon, whereby a pesticide is divided between the soil and water phase; also referred to as adsorption partition coefficient.

Parts Per Billion (ppb)/Parts Per Million (ppm): Units commonly used to express contamination ratios, as in establishing the maximum permissible amount of a contaminant in water, land, or air.

Pathogens: Microorganisms that can cause disease in other organisms or in humans, animals and plants (e.g., bacteria, viruses, or parasites) found in sewage, in runoff from farms or rural areas populated with domestic and wild animals, and in water used for swimming. Fish and shellfish contaminated by pathogens, or the contaminated water itself, can cause serious illness.

Peak Electricity Demand: The maximum electricity used to meet the cooling load of a building or buildings in a given area.

Peak Levels: Levels of airborne pollutant contaminants much higher than average or occurring for short periods of time in response to sudden releases.

Percolation: The movement of water downward and radially through sub-surface soil layers, usually continuing downward to ground water; can also involve upward movement of water.

Performance Data (for incinerators): Information collected, during a trial burn, on concentrations of designated organic compounds and pollutants found in incinerator emissions. Data analysis must show that the incinerator meets performance standards under operating conditions specified in the RCRA permit. (See: trial burn; performance standards.)

Performance Standards: (1) Regulatory requirements limiting the concentrations of designated organic compounds, particulate matter, and hydrogen chloride in emissions from incinerators. (2) Operating standards established by EPA for various permitted pollution control systems, asbestos inspections, and various program operations and maintenance requirements.

Permeability: The rate at which liquids pass through soil or other materials in a specified direction.

Permit: An authorization, license, or equivalent control document issued by EPA or an approved state agency to implement the requirements of an environmental regulation; e.g., a permit to operate a wastewater treatment plant or to operate a facility that may generate harmful emissions.

Persistence: Refers to the length of time a compound stays in the environment, once introduced. A compound may persist for less than a second or indefinitely.

Persistent Pesticides: Pesticides that do not break down chemically or break down very slowly and remain in the environment after a growing season.

Personal Air Samples: Air samples taken with a pump is directly attached to the worker with the collecting filter and cassette placed in the worker's breathing zone (required under OSHA asbestos standards and EPA worker protection rule).

Pest: An insect, rodent, nematode, fungus, weed or other form of terrestrial or aquatic plant or animal life that is injurious to

Pesticide Tolerance: The amount of pesticide residue allowed by law to remain in or on a harvested crop. EPA sets these levels well below the point where the compounds might be harmful to consumers.

Pesticide: Substances or mixture thereof intended for preventing, destroying, repelling, or mitigating any pest. Also, any substance or mixture intended for use as a plant regulator, defoliant, or desiccant.

Phenols: Organic compounds that are byproducts of petroleum refining, tanning, and textile, dye, and resin manufacturing. Low concentrations cause taste and odor problems in water; higher concentrations can kill aquatic life and humans.

Phosphates: Certain chemical compounds containing phosphorus.

Phosphogypsum Piles (stacks): Principal byproduct generated in production of phosphoric acid from phosphate rock. These piles may generate radioactive radon gas.

Phosphorous Plants: Facilities using electric furnaces to produce elemental phosphorous for commercial use, such as high grade phosphoric acid, phosphate-based detergent, and organic chemicals use.

Phosphorus: An essential chemical food element that can contribute to the eutrophication of lakes and other water bodies. Increased phosphorus levels result from discharge of phosphorus-containing materials into surface waters.

Photochemical Oxidants: Air pollutants formed by the action of sunlight on oxides of nitrogen and hydrocarbons.

Photochemical Smog: Air pollution caused by chemical reactions of various pollutants emitted from different sources.

Photosynthesis: The manufacture by plants of carbohydrates and oxygen from carbon dioxide mediated by chlorophyll in the presence of sunlight.

Physical and Chemical Treatment: Processes generally used in large-scale wastewater treatment facilities. Physical processes may include air-stripping or filtration. Chemical treatment includes coagulation, chlorination, or ozonation. The term can also refer to treatment of toxic materials in surface and ground waters, oil spills, and some methods of dealing with hazardous materials on or in the ground.

Phytoplankton: That portion of the plankton community comprised of tiny plants, e.g., algae, diatoms.

Phytotoxic: Harmful to plants.

Picocuries Per Liter pCi/L: A unit of measure for levels of radon gas.

Pilot Tests: Testing a cleanup technology under actual site conditions to identify potential problems prior to full-scale implementation.

Plankton: Tiny plants and animals that live in water.

Plasma-arc Reactor: An incinerator that operates at extremely high temperatures; treats highly toxic wastes that do not burn easily.

Plasmid: A circular piece of DNA that exists apart from the chromosome and replicates independently of it. Bacterial plasmids carry information that renders the bacteria resistant to antibiotics. Plasmids are often used in genetic engineering to carry desired genes into organisms.

Plastics: Non-metallic chemoreactive compounds molded into rigid or pliable construction materials, fabrics, etc.

Plate Tower Scrubber: An air pollution control device that neutralizes hydrogen chloride gas by bubbling alkaline water through holes in a series of metal plates.

Plugging: Act or process of stopping the flow of water, oil, or gas into or out of a formation through a borehole or well penetrating that formation.

Plume: 1. A visible or measurable discharge of a contaminant from a given point of origin. Can be visible or thermal in water, or visible in the air as, for example, a plume of smoke. 2 The area of radiation leaking from a damaged reactor. 3. Area downwind within which a release could be dangerous for those exposed to leaking fumes.

Plutonium: A radioactive metallic element chemically similar to uranium.

PM-10: A new standard for measuring the amount of solid or liquid matter suspended in the atmosphere, i.e. the amount of particulate matter over 10 micrometers in diameter; smaller PM-10 particles penetrate to the deeper portions of the lung, affecting sensitive population groups such as children and individuals with respiratory ailments.

Point Source: A stationary location or fixed facility from which pollutants are discharged; any single identifiable source of pollution, e.g., a pipe, ditch, ship, ore pit, factory smokestack.

Pollen: The fertilizing element of flowering plants; background air pollutant.

Pollutant: Generally, any substance introduced into the environment that adversely affects the usefulness of a resource.

Pollution Prevention: The active process of identifying areas, processes, and activities which create excessive waste byproducts for the purpose of substitution, alteration, or elimination of the process to prevent waste generation.

Pollutant Standard Index (PSI): Measure of adverse health effects of air pollution levels in major cities.

Pollution: Generally, the presence of matter or energy whose nature, location, or quantity produces undesired environmental effects. Under the Clean Water Act, for example, the term is defined as the man-made or man-induced alteration of the physical, biological, chemical, and radiological integrity of water.

Polonium: A radioactive element that occurs in pitchblende and other uranium-containing ores.

Polyelectrolytes: Synthetic chemicals that help solids to clump during sewage treatment.

Polymer: Basic molecular ingredients in plastic.

Polyvinyl Chloride (PVC): A tough, environmentally indestructible plastic that releases hydrochloric acid when burned.

Population: A group of interbreeding organisms occupying a particular space; the number of humans or other living creatures in a designated area.

Post-Closure: The time period following the shutdown of a waste management or manufacturing facility; for monitoring purposes, often considered to be 30 years.

Post-Consumer Recycling: Reuse of materials generated from residential and consumer waste, e.g. converting wastepaper from offices into corrugated boxes or newsprint.

Potable Water: Water that is safe for drinking and cooking.

Potentially Responsible Party (PRP): Any individual or company-including owners, operators, transporters or generators-potentially responsible for, or contributing to a spill or other contamination at a Superfund site. Whenever possible, through administrative and legal actions, EPA requires PRPs to clean up hazardous sites they have contaminated.

Precipitate: A solid that separates from a solution.

Precipitation: Removal of hazardous solids from liquid waste to permit safe disposal; removal of particles from airborne emissions.

Precipitator: Pollution control device that collects particles from an air stream.

Precursor: In photochemistry, a compound antecedent to a volatile organic compound (VOC). Precursors react in sunlight to form ozone or other photochemical oxidants.

Preliminary Assessment: The process of collecting and reviewing available information about a known or suspected waste site or release.

Pressure Sewers: A system of pipes in which water, wastewater, or other liquid is pumped to a higher elevation.

Pretreatment: Processes used to reduce, eliminate, or alter the nature of wastewater pollutants from non-domestic sources before they are discharged into publicly owned treatment works (POTWs).

Prevalent Level Samples: Air samples taken under normal conditions (also known as ambient background samples).

Prevalent Levels: Levels of airborne contaminant occurring under normal conditions.

Prevention of Significant Deterioration (PSD): EPA program in which state and/or federal permits are required in order to restrict emissions from new or modified sources in places where air quality already meets or exceeds primary and secondary ambient air quality standards.

Primary Drinking Water Regulation: Applies to public water systems and specifies a contaminant level, which, in the judgment of the EPA Administrator, will not adversely affect human health.

Primary Waste Treatment: First steps in wastewater treatment; screens and sedimentation tanks are used to remove most materials that float or will settle. Primary treatment removes about 30 percent of carbonaceous biochemical oxygen demand from domestic sewage.

Principal Organic Hazardous Constituents (POHCs): Hazardous compounds monitored during an incinerator's trial burn, selected for high concentration in the waste feed and difficulty of combustion.

Probability of Detection: The likelihood, expressed as a percentage, that a test method will correctly identify a leaking tank.

Process Verification: Verifying that process raw materials, water usage, waste treatment processes, production rate and other facts relative to quantity and quality of pollutants contained in discharges are substantially described in the permit application and the issued permit.

Process Wastewater: Any water that comes into contact with any raw material, product, byproduct, or waste.

Process Weight: Total weight of all materials, including fuel, used in a manufacturing process; used to calculate the allowable particulate emission rate.

Product Level: The level of a product in a storage tank.

Products of Incomplete Combustion (PICs): Organic compounds formed by combustion. Usually generated in small amounts and sometimes toxic, PICs are heat-altered versions of the original material fed into the incinerator (e.g., charcoal is a P.C. from burning wood).

Propellant: Liquid in a self-pressurized pesticide product that expels the active ingredient from its container.

Proposed Plan: A plan for a site cleanup that is available to the public for comment.

Proteins: Complex nitrogenous organic compounds of high molecular weight made of amino acids; essential for growth and repair of animal tissue. Many, but not all, proteins are enzymes.

Protocol: A series of formal steps for conducting a test.

Protoplast: A membrane-bound cell from which the outer wall has been partially or completely removed. The term often is applied to plant cells.

Protozoa: One-celled animals that are larger and more complex than bacteria. May cause disease.

Public Comment Period: The time allowed for the public to express its views and concerns regarding an action by EPA (e.g., a Federal Register Notice of proposed rule-making, a public notice of a draft permit, or a Notice of Intent to Deny).

Public Hearing: A formal meeting wherein EPA officials hear the public's views and concerns about an EPA action or proposal. EPA is required to consider such comments when evaluating its actions. Public hearings must be held upon request during the public comment period.

Public Notice: 1. Notification by EPA informing the public of Agency actions such as the issuance of a draft permit or scheduling of a hearing. EPA is required to ensure proper public notice, including publication in newspapers and broadcast over radio stations. 2. In the safe drinking water program, water suppliers are required to publish and broadcast notices when pollution problems are discovered.

Public Water System: A system that provides piped water for human consumption to at least 15 service connections or regularly serves 25 individuals.

Publicly Owned Treatment Works: A waste-treatment works owned by a state, unit of local government, or Indian tribe, usually designed to treat domestic wastewaters.

Pumping Station: Pumping devices installed in sewer or water systems or other liquid-carrying pipelines to move the liquids to a higher level.

Putrescible: Able to rot quickly enough to cause odors and attract flies.

Pyrolysis: Decomposition of a chemical by extreme heat.

Q

Quality Assurance/Quality Control: A system of procedures, checks, audits, and corrective actions to ensure that all EPA research design and performance, environmental monitoring and sampling, and other technical and reporting activities of the highest achievable quality.

Quench Tank: A water-filled tank used to cool incinerator residues or hot materials during industrial processes.

R

Radiation Standards: Regulations that set maximum exposure limits for protection of the public from radioactive materials.

Radio Frequency Radiation: (See Non-ionizing Radiation.)

Radioactive Substances: Substances that emit ionizing radiation.

Radioisotopes: Chemical variants of an element with potentially oncogenic, teratogenic, and mutagenic effects on the human body.

Radionuclide: Radioactive particle, man-made or natural, with a distinct atomic weight number. Can have a long life as soil or water pollutants.

Radius of Vulnerability Zone: The maximum distance from the point of release of a hazardous substance in which the airborne concentration could reach the level of concern under specified weather conditions.

Radon Decay Products: A term used to refer collectively to the immediate products of the radon decay chain. These include Po-218, Pb-214, Bi-214, and Po-214, which have an average combined half-life of about 30 minutes.

Radon: A colorless naturally occurring, radioactive, inert gas formed by radioactive decay of radium atoms in soil or rocks.

Rasp: A machine that grinds waste into a manageable material and helps prevent odor.

Raw Sewage: Untreated wastewater and its contents.

Raw Water: Intake water prior to any treatment or use.

Reasonably Available Control Measures (RACM): A broadly defined term referring to technological and other measures for pollution control.

Reasonably Available Control Technology (RACT): Control technology that is both reasonably available, and both technologically and economically feasible. Usually applied to existing sources in nonattainment areas; in most cases is less stringent than new source performance standards.

Receiving Waters: A river, lake, ocean, stream or other watercourse into which wastewater or treated effluent is discharged.

Recharge: The process by which water is added to a zone of saturation, usually by percolation from the soil surface, e.g., the recharge of an aquifer.

Recharge Area: A land area in which water reaches the zone of saturation from surface infiltration, e.g., where rainwater soaks through the earth to reach an aquifer.

Recombinant Bacteria: A microorganism whose genetic makeup has been altered by deliberate introduction of new genetic elements. The offspring of these altered bacteria also contain these new genetic elements, i.e. they "breed true."

Recombinant DNA: The new DNA that is formed by combining pieces of DNA from different organisms or cells.

Recommended Maximum Contaminant Level (RMCL): The maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on human health would occur, and that includes an adequate margin of safety. Recommended levels are nonenforceable health goals. (See: maximum contaminant level.)

Reconstructed Source: Facility in which components are replaced to such an extent that the fixed capital cost of the new components exceed 50 percent of the capital cost of constructing a comparable brand-new facility. New-source performance standards may be applied to sources reconstructed after the proposal of the standard if it is technologically and economically feasible to meet the standard.

Record of Decision (ROD): A public document that explains which cleanup alternative(s) will be used at National Priorities List sites where, under CERCLA, Trust Funds pay for the cleanup.

Recovery Rate: Percentage of usable recycled materials that have been removed from the total amount of municipal solid waste generated in a specific area or by a specific business.

Reclamation: (In recycling) Restoration of materials found in the waste stream to a beneficial use which may be for purposes other than the original use.

Recycle/Reuse: Minimizing waste generation by recovering and reprocessing usable products that might otherwise become waste (i.e. recycling of aluminum cans, paper, and bottles, etc.).

Red Bag Waste: (See: infectious waste.)

Red Border: An EPA document undergoing review before being submitted for final management decision-making.

Red Tide: A proliferation of a marine plankton toxic and often fatal to fish; perhaps stimulated by the addition of nutrients. A tide can be red, green, or brown, depending on the coloration of the plankton.

Reentry Interval: The period of time immediately following the application of a pesticide during which unprotected workers should not enter a field.

Reference Dose (RfD): The concentration of a chemical known to cause health problems; also be referred to as the ADI, or acceptable daily intake.

Reformulated Gasoline: Gasoline with a different composition from conventional gasoline (e.g., lower aromatics content) that cuts air pollutants.

Refuse Reclamation: Conversion of solid waste into useful products, e.g., composting organic wastes to make soil conditioners or separating aluminum and other metals for recycling.

Refuse: (See: solid waste.)

Regeneration: Manipulation of cells to cause them to develop into whole plants.

Regional Response Team (RRT): Representatives of federal, local, and state agencies who may assist in coordination of activities at the request of the On-Scene Coordinator before and during a significant pollution incident such as an oil spill, major chemical release, or a Superfund response.

Registrant: Any manufacturer or formulator who obtains registration for a pesticide active ingredient or product.

Registration: Formal listing with EPA of a new pesticide before it can be sold or distributed. Under the Federal Insecticide, Fungicide, and Rodenticide Act. EPA is responsible for registration (pre-market licensing) of pesticides on the basis of data demonstrating no unreasonable adverse effects on human health or the environment when applied according to approved label directions.

Registration Standards: Published documents which include summary reviews of the data available on a pesticide's active ingredient, data gaps, and the Agency's existing regulatory position on the pesticide.

Regulated Asbestos-Containing Material (RACM): Friable asbestos material or nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or has crumbled, or been pulverized or reduced to powder in the course of demolition or renovation operations.

Regulated Medical Waste: Under the Medical Waste Tracking Act of 1988, any solid waste generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals. Included are cultures and stocks of infectious agents; human blood and blood products; human pathological body wastes from surgery and autopsy; contaminated animal carcasses from medical research; waste from patients with communicable diseases; and all used sharp implements, such as needles and scalpels, etc., and certain unused sharps. (See: treated medical waste; untreated medical waste; destroyed medical waste.)

Release: Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of a hazardous or toxic chemical or extremely hazardous substance.

Remedial Action (RA): The actual construction or implementation phase of a Superfund site cleanup that follows remedial design.

Remedial Design: A phase of remedial action that follows the remedial investigation/feasibility study and includes development of engineering drawings and specifications for a site cleanup.

Remedial Investigation: An in-depth study designed to gather data needed to determine the nature and extent of contamination at a Superfund site; establish site cleanup criteria; identify preliminary alternatives for remedial action; and support technical and cost analyses of alternatives. The remedial investigation is usually done with the feasibility study. Together they are usually referred to as the "RI/FS".

Remedial Project Manager (RPM): The EPA or state official responsible for overseeing on-site remedial action.

Remedial Response: Long-term action that stops or substantially reduces a release or threat of a release of hazardous substances that is serious but not an immediate threat to public health.

Remediation: 1. Cleanup or other methods used to remove or contain a toxic spill or hazardous materials from a Superfund site; 2. for the Asbestos Hazard Emergency Response program, abatement methods including evaluation, repair, enclosure, encapsulation, or removal of greater than 3 linear feet or square feet of asbestos-containing materials from a building.

Remote Sensing: The collection and interpretation of information about an object without physical contact with the object; e.g., satellite imaging and aerial photograph.

Removal Action: Short-term immediate actions taken to address releases of hazardous substances that require expedited response. (See: cleanup.)

Reportable Quantity (RQ): Quantity of a hazardous substance that triggers reports under CERCLA. If a substance exceeds its RQ, the release must be reported to the National Response Center, the SERC, and community emergency coordinators for areas likely to be affected.

Repowering: Replacement of an existing coal-fired boiler with one or more clean coal technologies in order to achieve significantly greater emission reduction relative to the performance of technology in widespread use at the time the Clean Air Act amendments of 1990 were enacted. (See: Clean coal technology.)

Reregistration: The reevaluation and relicensing of existing pesticides originally registered prior to current scientific and regulatory standards. EPA reregisters pesticides through its Registration Standards Program.

Reserve Capacity: Extra treatment capacity built into solid waste and wastewater treatment plants and interceptor sewers to accommodate flow increases due to future population growth.

Reservoir: Any natural or artificial holding area used to store, regulate, or control water.

Residual: Amount of a pollutant remaining in the environment after a natural or technological process has taken place, e.g., the sludge remaining after initial wastewater treatment, or particulates remaining in air after it passes through a scrubbing or other process.

Residual Risk: The extent of health risk from air pollutants remaining after application of the Maximum Achievable Control Technology (MACT).

Resistance: For plants and animals, the ability to withstand poor environmental conditions or attacks by chemicals or disease. May be inborn or acquired.

Resource Recovery: The process of obtaining matter or energy from materials formerly discarded.

Response Action: 1. Generic term for actions taken in response to actual or potential health-threatening environmental events such as spills, sudden releases, and asbestos abatement/management problems; 2. A CERCLA-authorized action involving either a short-term removal action or a long-term removal response. This may include but is not limited to: removing hazardous materials from a site to an EPA-approved hazardous waste facility for treatment, containment or treating the waste on-site, identifying and removing the sources of ground-water contamination and halting further migration of contaminants; 3. Any of the following actions taken in school buildings in response to AHERA to reduce the risk of exposure to asbestos: removal, encapsulation, enclosure, repair, and operations and maintenance. (See: cleanup).

Responsiveness Summary: A summary of oral and/or written public comments received by EPA during a comment period on key EPA documents, and EPA's response to those comments.

Restoration: Measures taken to return a site to pre-violation conditions.

Restricted Use: A pesticide may be classified (under FIFRA regulations) for restricted use if it requires special handling because of its toxicity, and, if so, it may be applied only by trained, certified applicators or those under their direct supervision.

Restriction Enzymes: Enzymes that recognize specific regions of a long DNA molecule and cut it at those points.

Reuse: Using a product or component of municipal solid waste in its original form more than once, e.g., refilling a glass bottle that has been returned or using a coffee can to hold nuts and bolts.

Reverse Osmosis: A treatment process used in water systems by adding pressure to force water through a semi-permeable membrane. Reverse osmosis removes most drinking water contaminants. Also used in wastewater treatment. Large-scale reverse osmosis plants are being developed.

Ribonucleic Acid (RNA): A molecule that carries the genetic message from DNA to a cellular protein-producing mechanism.

Ringlemann Chart: A series of shaded illustrations used to measure the opacity of air pollution emissions, ranging from light grey through black; used to set and enforce emissions standards.

Riparian Habitat: Areas adjacent to rivers and streams with a high density, diversity, and productivity of plant and animal species relative to nearby uplands.

Riparian Rights: Entitlement of a land owner to certain uses of water on or bordering his property, including the right to prevent diversion or misuse of upstream waters. Generally a matter of state law.

Risk: A measure of the probability that damage to life, health, property, and/or the environment will occur as a result of a given hazard.

Risk Assessment: Qualitative and quantitative evaluation of the risk posed to human health and/or the environment by the actual or potential presence and/or use of specific pollutants.

Risk Communication: The exchange of information about health or environmental risks among risk assessors and managers, the general public, news media, interest groups, etc.

Risk Management: The process of evaluating and selecting alternative regulatory and non-regulatory responses to risk. The selection process necessarily requires the consideration of legal, economic, and behavioral factors.

River Basin: The land area drained by a river and its tributaries.

Rodenticide: A chemical or agent used to destroy rats or other rodent pests, or to prevent them from damaging food, crops, etc.

Rotary Kiln Incinerator: An incinerator with a rotating combustion chamber that keeps waste moving, thereby allowing it to vaporize for easier burning.

Rough Fish: Fish not prized for eating, such as gar and suckers. Most are more tolerant of changing environmental conditions than game species.

Rubbish: Solid waste, excluding food waste and ashes, from homes, institutions, and work-places.

Run-Off: That part of precipitation, snow melt, or irrigation water that runs off the land into streams or other surface-water. It can carry pollutants from the air and land into receiving waters.

S

Safener: A chemical added to a pesticide to keep it from injuring plants.

Salinity: The percentage of salt in water.

Salt Water Intrusion: The invasion of fresh surface or ground water by salt water. If it comes from the ocean it may be called sea water intrusion.

Salts: Minerals that water picks up as it passes through the air, over and under the ground, or from households and industry.

Salvage: The utilization of waste materials.

Sanctions: Actions taken by the federal government for failure to plan or implement a State Improvement Plan (SIP). Such action may be include withholding of highway funds and a ban on construction of new sources of potential pollution.

Sand Filters: Devices that remove some suspended solids from sewage. Air and bacteria decompose additional wastes filtering through the sand so that cleaner water drains from the bed.

Sanitary Landfill: (See: landfills.)

Sanitary Sewers: Underground pipes that carry off only domestic or industrial waste, not storm water.

Sanitary Survey: An on-site review of the water sources, facilities, equipment, operation and maintenance of a public water system to evaluate the adequacy of those elements for producing and distributing safe drinking water.

Sanitary Water (Also known as gray water): Water discharged from sinks, showers, kitchens, or other nonindustrial operations, but not from commodes.

Sanitation: Control of physical factors in the human environment that could harm development, health, or survival.

Saturated Zone: A subsurface area in which all pores and cracks are filled with water under pressure equal to or greater than that of the atmosphere.

Scrap: Materials discarded from manufacturing operations that may be suitable for reprocessing.

Screening: Use of screens to remove coarse floating and suspended solids from sewage.

Science Advisory Board (SAB): A group of external scientists who advise EPA on science and policy.

Scrubber: An air pollution device that uses a spray of water or reactant or a dry process to trap pollutants in emissions.

Secondary Drinking Water Regulations: Non-enforceable regulations applying to public water systems and specifying the maximum contamination levels that, in the judgment of EPA, are required to protect the public welfare. These regulations apply to any contaminants that may adversely affect the odor or appearance of such water and consequently may cause people served by the system to discontinue its use.

Secondary Materials: Materials that have been manufactured and used at least once and are to be used again.

Secondary Treatment: The second step in most publicly owned waste treatment systems in which bacteria consume the organic parts of the waste. It is accomplished by bringing together waste, bacteria, and oxygen in trickling filters or in the activated sludge process. This treatment removes floating and settleable solids and about 90 percent of the oxygen-demanding substances and suspended solids. Disinfection is the final stage of secondary treatment. (See: primary, tertiary treatment.)

Secure Chemical Landfill: (See: landfills.)

Secure Maximum Contaminant Level: Maximum permissible level of a contaminant in water delivered to the free flowing outlet of the ultimate user, or of contamination resulting from corrosion of piping and plumbing caused by water quality.

Sedimentation Tanks: Wastewater tanks in which floating wastes are skimmed off and settled solids are removed for disposal.

Sedimentation: Letting solids settle out of wastewater by gravity during treatment.

Sediments: Soil, sand, and minerals washed from land into water, usually after rain. They pile up in reservoirs, rivers and harbors, destroying fish and wildlife habitat, and clouding the water so that sunlight cannot reach aquatic plants. Careless farming, mining, and building activities will expose sediment materials, allowing them to wash off the land after rainfall.

Seed Protectant: A chemical applied before planting to protect seeds and seedlings from disease or insects.

Seepage: Percolation of water through the soil from unlined canals, ditches, laterals, watercourses, or water storage facilities.

Selective Pesticide: A chemical designed to affect only certain types of pests, leaving other plants and animals unharmed.

Semi-Confined Aquifer: An aquifer partially confined by soil layers of low permeability through which recharge and discharge can still occur.

Senescence: The aging process. Sometimes used to describe lakes or other bodies of water in advanced stages of eutrophication.

Septic Tank: An underground storage tank for wastes from homes not connected to a sewer line. Waste goes directly from the home to the tank, where it is decomposed by bacteria. The sludge settles to the bottom and is pumped out periodically, but effluent flows into the ground through drains.

Service Connector: The pipe that carries tap water from a public water main to a building.

Settleable Solids: Material heavy enough to sink to the bottom of a wastewater treatment tank.

Settling Chamber: A series of screens placed in the way of flue gases to slow the stream of air, thus helping gravity to pull particles into a collection device.

Settling Tank: A holding area for wastewater, where heavier particles sink to the bottom for removal and disposal.

7Q10: Seven-day, consecutive low flow with a ten year return frequency; the lowest stream flow for seven consecutive days that would be expected to occur once in ten years.

Sewage: The waste and wastewater produced by residential and commercial sources and discharged into sewers.

Sewage Lagoon: (See: lagoon.)

Sewage Sludge: Sludge produced at a Publicly Owned Treatment Works, the disposal of which is regulated under the Clean Water Act.

Sewer: A channel or conduit that carries wastewater and storm-water runoff from the source to a treatment plant or receiving stream. "Sanitary" sewers carry household, industrial, and commercial waste. "Storm" sewers carry runoff from rain or snow. "Combined" sewers handle both.

Sewerage: The entire system of sewage collection, treatment, and disposal.

Sharps: Hypodermic needles, syringes (with or without the attached needle) pasteur pipettes, scalpel blades, blood vials, needles with attached tubing, and culture dishes used in animal or human patient care or treatment, or in medical, research or industrial laboratories. Also included are other types of broken or unbroken glassware that were in contact with infectious agents, such as used slides and cover slips, and unused hypodermic and suture needles, syringes, and scalpel blades.

Signal: The volume or product-level change produced by a leak in a tank.

Signal Words: The words used on a pesticide label-Danger, Warning, Caution-to indicate level of toxicity.

Significant Deterioration: Pollution resulting from a new source in previously "clean" areas. (See: prevention of significant deterioration.)

Significant Municipal Facilities: Those publicly owned sewage treatment plants that discharge a million gallons per day or more and are therefore considered by states to have the potential for to substantially effect the quality of receiving waters.

Significant Non-Compliance: (See Significant Violations.)

Significant Violations: Violations by point source dischargers of sufficient magnitude or duration to be a regulatory priority.

Silviculture: Management of forest land for timber. Sometimes contributes to water pollution, as in clear-cutting.

Sinking: Controlling oil spills by using an agent to trap the oil and sink it to the bottom of the body of water where the agent and the oil are biodegraded.

Site Assessment Program: A means of evaluating hazardous waste sites through preliminary assessments and site inspections to develop a Hazard Ranking System score.

Site Inspection: The collection of information from a Superfund site to determine the extent and severity of hazards posed by the site. It follows and is more extensive than a preliminary assessment. The purpose is to gather information necessary to score the site, using the Hazard Ranking System, and to determine if it presents an immediate threat requiring prompt removal.

Site Safety Plan: A crucial element in all removal actions, it includes information on equipment being used, precautions to be taken, and steps to take in the event of an on-site emergency.

Siting: The process of choosing a location for a facility.

Skimming: Using a machine to remove oil or scum from the surface of the water.

Slow Sand Filtration: Passage of raw water through a bed of sand at low velocity, resulting in substantial removal of chemical and biological contaminants.

Sludge: A semi-solid residue from any of a number of air or water treatment processes; can be a hazardous waste.

Sludge Digester: Tank in which complex organic substances like sewage sludges are biologically dredged. During these reactions, energy is released and much of the sewage is converted to methane, carbon dioxide, and water.

Slurry: A watery mixture of insoluble matter resulting from some pollution control techniques.

Small Quantity Generator (SQG-sometimes referred to as "Squeegee"): Persons or enterprises that produce 220-2200 pounds per month of hazardous waste; are required to keep more records than conditionally exempt generators. The largest category of hazardous waste generators, SQGs include automotive shops, dry cleaners, photographic developers, and a host of other small businesses. (See: conditionally exempt generators).

Smelter: A facility that melts or fuses ore, often with an accompanying chemical change, to separate its metal content. Emissions cause pollution. "Smelting" is the process involved.

Smog: Air pollution associated with oxidants. (See: photochemical smog.)

Smoke: Particles suspended in air after incomplete combustion.

Soft Detergents: Cleaning agents that break down in nature.

Soft Water: Any water that does not contain a significant amount of dissolved minerals such as salts of calcium or magnesium.

Soil Adsorption Field: A sub-surface area containing a trench or bed with clean stones and a system of piping through which treated sewage may seep into the surrounding soil for further treatment and disposal.

Soil and Water Conservation Practices: Control measures consisting of managerial, vegetative, and structural practices to reduce the loss of soil and water.

Soil Conditioner: An organic material like humus or compost that helps soil absorb water, build a bacterial community, and take up mineral nutrients.

Soil Erodibility: An indicator of a soil's susceptibility to raindrop impact, runoff, and other erosive processes.

Soil Gas: Gaseous elements and compounds in the small spaces between particles of the earth and soil. Such gases can be moved or driven out under pressure.

Soil Sterilant: A chemical that temporarily or permanently prevents the growth of all plants and animals, depending on the chemical.

Sole-Source Aquifer: An aquifer that supplies 50-percent or more of the drinking water of an area.

Solid Waste: Non-liquid, non-soluble materials ranging from municipal garbage to industrial wastes that contain complex and sometimes hazardous substances. Solid wastes also include sewage sludge, agricultural refuse, demolition wastes, and mining residues. Technically, solid waste also refers to liquids and gases in containers.

Solid Waste Disposal: The final placement of refuse that is not salvaged or recycled.

Solid Waste Management: Supervised handling of waste materials from their source through recovery processes to disposal.

Solidification and Stabilization: Removal of wastewater from a waste or changing it chemically to make it less permeable and susceptible to transport by water.

Soot: Carbon dust formed by incomplete combustion.

Sorption: The action of soaking up or attracting substances; process used in many pollution control systems.

Source Reduction: Reducing the amount of materials entering the waste stream by redesigning products or patterns of production or consumption (e.g., using returnable beverage containers). Synonymous with waste reduction.

Source Separation: Segregating various wastes at the point of generation (e.g., separation of paper, metal and glass from other wastes to make recycling simpler and more efficient.)

Special Review: Formerly known as Rebuttable Presumption Against Registration (RPAR), this is the regulatory process through which existing pesticides suspected of posing unreasonable risks to human health, non-target organisms, or the environment are referred for review by EPA. Such review requires an intensive risk/benefit analysis with opportunity for public comment. If risk is found to outweigh social and economic benefits, regulatory actions ranging from label revisions and use-restriction to cancellation or suspended registration can be initiated.

Special Waste: Items such as household hazardous waste, bulky wastes (refrigerators, pieces of furniture, etc.) tires, and used oil.

Species: A reproductively isolated aggregate of interbreeding organisms.

Spill Prevention Control and Countermeasures Plan (SPCCP): Plan covering the release of hazardous substances as defined in the Clean Water Act.

Spoil: Dirt or rock removed from its original location-destroying the composition of the soil in the process-as in strip-mining, dredging, or construction.

Sprawl: Unplanned development of open land.

Spray Tower Scrubber: A device that sprays alkaline water into a chamber where acid gases present to aid in the neutralizing of the gas.

Stable Air: A motionless mass of air that holds instead of dispersing pollutants.

Stabilization: Conversion of the active organic matter in sludge into inert, harmless material.

Stack: A chimney, smokestack, or vertical pipe that discharges used air.

Stabilization Ponds: (See: lagoon.)

Stack Effect: Air, as in a chimney, that moves upward because it is warmer than the ambient atmosphere.

Stack Gas: (See: flue gas.)

Stage II Controls: Systems placed on service station gasoline pumps to control and capture gasoline vapors during refueling.

Stagnation: Lack of motion in a mass of air or water that holds pollutants in place.

Standards: Norms that impose limits on the amount of pollutants or emissions produced. EPA establishes minimum standards, but states are allowed to be stricter.

Start of a Response Action: The point in time when there is a guarantee or set-aside of funding either by EPA, other federal agencies, states or Principal Responsible Parties in order to begin response actions at a Superfund site.

State Emergency Response Commission (SERC): Commission appointed by each state governor according to the requirements of SARA Title III. The SERCs designate emergency planning districts, appoint local emergency planning committees, and supervise and coordinate their activities.

State Implementation Plans (SIP): EPA-approved state plans for the establishment, regulation, and enforcement of air pollution standards.

Stationary Source: A fixed-site producer of pollution, mainly power plants and other facilities using industrial combustion processes.

Storage: Temporary holding of waste pending treatment or disposal, as in containers, tanks, waste piles, and surface impoundments.

Storm Sewer: A system of pipes (separate from sanitary sewers) that carries only water runoff from buildings and land surfaces.

Stratification: Separating into layers.

Stratosphere: The portion of the atmosphere 10-to-25 miles above the earth's surface.

Strip-Cropping: Growing crops in a systematic arrangement of strips or bands that serve as barriers to wind and water erosion.

Strip-Mining: A process that uses machines to scrape soil or rock away from mineral deposits just under the earth's surface.

Structural Deformation: Distortion in walls of a tank after liquid has been added or removed.

Sulfur Dioxide (SO₂): A pungent, colorless, gaseous pollutant formed primarily by the combustion of fossil fuels.

Sump: A pit or tank that catches liquid runoff for drainage or disposal.

Supercritical Water: A type of thermal treatment using moderate temperatures and high pressures to enhance the ability of water to break down large organic molecules into smaller, less toxic ones. Oxygen injected during this process combines with simple organic compounds to form carbon dioxide and water.

Superfund: The program operated under the legislative authority of CERCLA and SARA that funds and carries out EPA solid waste emergency and long-term removal and remedial activities. These activities include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority, and conducting and/or supervising the cleanup and other remedial actions.

Superfund Innovative Technology Evaluation: EPA program to promote development and use of innovative treatment technologies in Superfund site cleanups.

Surface Impoundment: Treatment, storage, or disposal of liquid hazardous wastes in ponds.

Surface Uranium Mines: Strip mining operations for removal of uranium-bearing ore.

Surface Water: All water naturally open to the atmosphere (rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc.) and all springs, wells, or other collectors directly influenced by surface water.

Surfacing ACM: Asbestos-containing material that is sprayed or troweled on or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural members.

Surfacing Material: Material sprayed or troweled onto structural members (beams, columns, or decking) for fire protection; or on ceilings or walls for fireproofing, acoustical or decorative purposes. Includes textured plaster, and other textured wall and ceiling surfaces.

Surfactant: A detergent compound that promotes lathering.

Surveillance System: A series of monitoring devices designed to check on environmental conditions.

Suspect Material: Building material suspected of containing asbestos, e.g., surfacing material, floor tile, ceiling tile, thermal system insulation, and miscellaneous other materials.

Suspended Loads: Sediment particles maintained in the water column by turbulence and carried with the flow of water.

Suspended Solids: Small particles of solid pollutants that float on the surface of, or are suspended in, sewage or other liquids. They resist removal by conventional means.

Suspension: Suspending the use of a pesticide when EPA deems it necessary to prevent an imminent hazard resulting from its continued use. An emergency suspension takes effect immediately; under an ordinary suspension a registrant can request a hearing before the suspension goes into effect. Such a hearing process might take six months.

Suspension Culture: Cells growing in a liquid nutrient medium.

Swamp: A type of wetland dominated by woody vegetation but without appreciable peat deposits. Swamps may be fresh or salt water and tidal or non-tidal. (See: wetlands.)

Synthetic Organic Chemicals (SOCs): Man-made organic chemicals. Some SOC's are volatile, others tend to stay dissolved in water instead of evaporating.

Systemic Pesticide: A chemical absorbed by an organism that makes the organism toxic to pests.

T

Tailings: Residue of raw material or waste separated out during the processing of crops or mineral ores.

Tail Water: The runoff of irrigation water from the lower end of an irrigated field.

Technical Assistance Grant (TAG): As part of the Superfund program, Technical Assistance Grants of up to \$50,000 are provided to citizens' groups to obtain assistance in interpreting information related to cleanups at Superfund sites or those proposed for the National Priorities List. Grants are used by such groups to hire technical advisors to help them understand the site-related technical information for the duration of response activities.

Technology-Based Limitations: Industry-specific effluent limitations applied to a discharge when it will not cause a violation of water quality standards at low stream flows. Usually applied to discharges into large rivers.

Technology-Based Standards: Effluent limitations applicable to direct and indirect sources which are developed on a category-by-category basis using statutory factors, not including water-quality effects.

Terracing: Dikes built along the contour of sloping farm land that hold runoff and sediment to reduce erosion.

Tertiary Treatment: Advanced cleaning of wastewater that goes beyond the secondary or biological stage, removing nutrients such as phosphorus, nitrogen, and most BOD and suspended solids.

Thermal Pollution: Discharge of heated water from industrial processes that can kill or injure aquatic organisms.

Thermal System Insulation (TSI): Asbestos-containing material applied to pipes, fittings, boilers, breeching, tanks, ducts, or other interior structural components to prevent heat loss or gain or water condensation.

Thermal Treatment: Use of elevated temperatures to treat hazardous wastes. (See: incineration; pyrolysis.)

Threshold Limit Value (TLV): The concentration of an airborne substance that an average person can be repeatedly exposed to without adverse effects. TLVs may be expressed in three ways: TLV-TWA-Time weighted average, based on an allowable exposure averaged over a normal 8-hour workday or 40-hour workweek; TLV-STEL-Short-term exposure limit or maximum concentration for a brief specified period of time, depending on a specific chemical (TWA must still be met); and TLV-C-Ceiling Exposure Limit or maximum exposure concentration not to be exceeded under any circumstances. (TWA must still be met.)

Threshold Planning Quantity: A quantity designated for each chemical on the list of extremely hazardous substances that triggers notification by facilities to the State Emergency Response Commission that such facilities are subject to emergency planning requirements under SARA Title III.

Tidal Marsh: Low, flat marshlands traversed by channels and tidal hollows, subject to tidal inundation; normally, the only vegetation present is salt-tolerant bushes and grasses. (See: wetlands.)

Time-weighted Average (TWA): In air sampling, the average air concentration of contaminants during a given period.

Tolerances: Permissible residue levels for pesticides in raw agricultural produce and processed foods. Whenever a pesticide is registered for use on a food or a feed crop, a tolerance (or exemption from the tolerance requirement) must be established. EPA establishes the tolerance levels, which are enforced by the Food and Drug Administration and the Department of Agriculture.

Tonnage: The amount of waste that a landfill accepts, usually expressed in tons per month. The rate at which a landfill accepts waste is limited by the landfill's permit.

Topography: The physical features of a surface area including relative elevations and the position of natural and man-made features.

Total Dissolved Phosphorous: The total phosphorous content of all material that will pass through a filter, which is determined as orthophosphate without prior digestion or hydrolysis. Also called soluble P. or ortho P.

Total Dissolved Solids (TDS): All material that passes the standard glass river filter; now called total filtrable residue. Term is used to reflect salinity.

Total Suspended Solids (TSS): A measure of the suspended solids in wastewater, effluent, or water bodies, determined by tests for "total suspended non-filterable solids." (See: suspended solids.)

Toxic Chemical Release Form: Information form required of facilities that manufacture, process, or use (in quantities above a specific amount) chemicals listed under SARA Title III.

Toxic Chemical: Any chemical listed in EPA rules as "Toxic Chemicals Subject to Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986."

Toxic Chemical Use Substitution: Replacing toxic chemicals with less harmful chemicals in industrial processes.

Toxic Cloud: Airborne plume of gases, vapors, fumes, or aerosols containing toxic materials.

Toxic Pollutants: Materials that cause death, disease, or birth defects in organisms that ingest or absorb them. The quantities and exposures necessary to cause these effects can vary widely.

Toxic Release Inventory: Database of toxic releases in the United States compiled from SARA Title III section 313 reports.

Toxic Substance: A chemical or mixture that may present an unreasonable risk of injury to health or the environment.

Toxic Waste: A waste that can produce injury if inhaled, swallowed, or absorbed through the skin.

Toxicity Testing: Biological testing (usually with an invertebrate, fish, or small mammal) to determine the adverse effects of a compound or effluent.

Toxicological Profile: An examination, summary, and interpretation of a hazardous substance to determine levels of exposure and associated health effects.

Transpiration: The process by which water vapor is lost to the atmosphere from living plants. The term can also be applied to the quantity of water thus dissipated.

Transportation Control Measures (TCMs): Steps taken by a locality to adjust traffic patterns (e.g., bus lanes, turnout, right turn on red) or reduce vehicle use (ride sharing, high-occupancy vehicle lanes) to cut vehicular emissions.

Trash: Material considered worthless or offensive that is thrown away. Generally defined as dry waste material, but in common usage it is a synonym for garbage, rubbish, or refuse.

Treatability Studies: Tests of potential cleanup technologies conducted in a laboratory (See: bench-scale tests.)

Trash-to-Energy Plan: Burning trash to produce energy.

Treated Regulated Medical Waste: Medical waste treated to substantially reduce or eliminate its pathogenicity, but that has not yet been destroyed.

Treatment Plant: A structure built to treat wastewater before discharging it into the environment.

Treatment, Storage, and Disposal Facility: Site where a hazardous substance is treated, stored, or disposed of. TSD facilities are regulated by EPA and states under RCRA.

Treatment: (1) Any method, technique, or process designed to remove solids and/or pollutants from solid waste, wastestreams, effluents, and air emissions. (2) methods used to change the biological character or composition of any regulated medical waste so as to substantially reduce or eliminate its potential for causing disease.

Trial Burn: An incinerator test in which emissions are monitored for the presence of specific organic compounds, particulates, and hydrogen chloride.

Trichloroethylene (TCE): A stable, low boiling-point colorless liquid, toxic if inhaled. Used as a solvent or metal decreasing agent, and in other industrial applications.

Trickling Filter: A coarse treatment system in which wastewater is trickled over a bed of stones or other material covered with bacteria that break down the organic waste and produce clean water.

Trickle Irrigation: Method in which water drips to the soil from perforated tubes or emitters.

Trihalomethane (THM): One of a family of organic compounds named as derivative of methane. THMs are generally by-products of chlorination of drinking water that contains organic material.

Trust Fund (CERCLA): A fund set up under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to help pay for cleanup of hazardous waste sites and for legal action to force those responsible for the sites to clean them up.

Tundra: A type of ecosystem dominated by lichens, mosses, grasses, and woody plants. Tundra is found at high latitudes (arctic tundra) and high altitudes (alpine tundra). Arctic tundra is underlain by permafrost and is usually saturated. (See: wetlands.)

Turbidimeter: A device that measures the density of suspended solids in a liquid.

Turbidity: 1. Haziness in air caused by the presence of particles and pollutants. 2. A cloudy condition in water due to suspended silt or organic matter.

Ultra Clean Coal (UCC): Coal that is washed, ground into fine particles, then chemically treated to remove sulfur, ash, silicone, and other substances; usually briquetted and coated with a sealant made from coal.

Ultraviolet Rays: Radiation from the sun that can be useful or potentially harmful. UV rays from one part of the spectrum (UV-A) enhance plant life and are useful in some medical and dental procedures; UV rays from other parts of the spectrum (UV-B) can cause skin cancer or other tissue damage. The ozone layer in the atmosphere partly shields us from ultraviolet rays reaching the earth's surface.

Underground Injection Control (UIC): The program under the Safe Drinking Water Act that regulates the use of wells to pump fluids into the ground.

Underground Sources of Drinking Water: Aquifers currently being used as a source of drinking water or those capable of supplying a public water system. They have a total dissolved solids content of 10,000 milligrams per liter or less, and are not "exempted aquifers." (See: exempted aquifer.)

Underground Storage Tank: A tank located at least partially underground and designed to hold gasoline or other petroleum products or chemicals.

Unreasonable Risk: Under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), "unreasonable adverse effects" means any unreasonable risk to man or the environment, taking into account the medical, economic, social, and environmental costs and benefits of any pesticide.

Unsaturated Zone: The area above the water table where soil pores are not fully saturated, although some water may be present.

Uranium Mill Tailings Piles: Former uranium ore processing sites that contain leftover radioactive materials (wastes), including radium and unrecovered uranium.

Uranium Mill-Tailings Waste Piles: Licensed active mills with tailings piles and evaporation ponds created by acid or alkaline leaching processes.

Urban Runoff: Storm water from city streets and adjacent domestic or commercial properties that carries pollutants of various kinds into the sewer systems and receiving waters.

Utility Load: The total electricity demand for a utility district.

V

Vapor Capture System: Any combination of hoods and ventilation system that captures or contains organic vapors so they may be directed to an abatement or recovery device.

Vapor Dispersion: The movement of vapor clouds in air due to wind, thermal action, gravity spreading, and mixing.

Vapor Plumes: Flue gases visible because they contain water droplets.

Variance: Government permission for a delay or exception in the application of a given law, ordinance, or regulation.

Vector: 1. An organism, often an insect or rodent, that carries disease. 2. Plasmids, viruses, or bacteria used to transport genes into a host cell. A gene is placed in the vector; the vector then "infects" the bacterium.

Vehicle Miles Travelled (VMT): A measure of the extent of motor vehicle operation; the total number of vehicle miles travelled within a specific geographic area over a given period of time.

Ventilation/Suction: The act of admitting fresh air into a space in order to replace stale or contaminated air; achieved by blowing air into the space. Similarly, suction represents the admission of fresh air into an interior space by lowering the pressure outside of the space, thereby drawing the contaminated air outward.

Venturi Scrubbers: Air pollution control devices that use water to remove particulate matter from emissions.

Vinyl Chloride: A chemical compound, used in producing some plastics, that is believed to be oncogenic.

Virgin Materials: Resources extracted from nature in their raw form, such as timber or metal ore.

Volatile: Any substance that evaporates readily.

Volatile Organic Compound (VOC): Any organic compound that participates in atmospheric photochemical reactions except those designated by EPA as having negligible photochemical reactivity.

Volatile Synthetic Organic Chemicals: Chemicals that tend to volatilize or evaporate.

Volume Reduction: Processing waste materials to decrease the amount of space they occupy, usually by compacting or shredding, incineration, or composting.

Volumetric Tank Test: One of several tests to determine the physical integrity of a storage tank; the volume of fluid in the tank is measured directly or calculated from product-level changes. A marked drop in volume indicates a leak.

Vulnerable Zone: An area over which the airborne concentration of a chemical accidentally released could reach the level of concern.

Vulnerability Analysis: Assessment of elements in the community that are susceptible to damage should a release of hazardous materials occur.

W

Waste: 1. Unwanted materials left over from a manufacturing process. 2. Refuse from places of human or animal habitation.

Waste Characterization: Identification of chemical and microbiological constituents of a waste material.

Waste Exchange: Arrangement in which companies exchange their wastes for the benefit of both parties.

Waste Feed: The continuous or intermittent flow of wastes into an incinerator.

Waste Load Allocation: The maximum load of pollutants each discharger of waste is allowed to release into a particular waterway. Discharge limits are usually required for each specific water quality criterion being, or expected to be, violated. The portion of a stream's total assimilative capacity assigned to an individual discharge.

Waste Minimization: Measures or techniques that reduce the amount of wastes generated during industrial production processes; term is also applied to recycling and other efforts to reduce the amount of waste going into the waste stream.

Waste Reduction: Using source reduction, recycling, or composting to prevent or reduce waste generation.

Waste Stream: The total flow of solid waste from homes, businesses, institutions, and manufacturing plants that are recycled, burned, or disposed of in landfills, or segments thereof such as the "residential waste stream" or the "recyclable waste stream."

Waste Treatment Lagoon: Impoundment made by excavation or earth fill for biological treatment of wastewater.

Waste Treatment Plant: A facility containing a series of tanks, screens, filters and other processes by which pollutants are removed from water.

Waste Treatment Stream: The continuous movement of waste from generator to treater and disposer.

Wastewater: The spent or used water from a home, community, farm, or industry that contains dissolved or suspended matter.

Wastewater Infrastructure: The plan or network for the collection, treatment, and disposal of sewage in a community. The level of treatment will depend on the size of the community, the type of discharge, and/or the designated use of the receiving water.

Wastewater Operations and Maintenance: Actions taken after construction to assure that facilities constructed to treat wastewater will be operated, maintained, and managed to reach prescribed effluent levels in an optimum manner.

Water Pollution: The presence in water of enough harmful or objectionable material to damage the water's quality.

Water Purveyor: A public utility, mutual water company, county water district, or municipality that delivers drinking water to customers.

Water Quality Criteria: Levels of water quality expected to render a body of water suitable for its designated use. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, fish production, or industrial processes.

Water Quality Standards: State-adopted and EPA-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.

Water Quality-Based Limitations: Effluent limitations applied to dischargers when mere technology-based limitations would cause violations of water quality standards. Usually applied to discharges into small streams.

Water Quality-Based Permit: A permit with an effluent limit more stringent than one based on technology performance. Such limits may be necessary to protect the designated use of receiving waters (i.e., recreation, irrigation, industry or water supply).

Water Solubility: The maximum possible concentration of a chemical compound dissolved in water. If a substance is water soluble it can very readily disperse through the environment.

Water Supplier: One who owns or operates a public water system.

Water Supply System: The collection, treatment, storage, and distribution of potable water from source to consumer.

Water Table: The level of groundwater.

Watershed: The land area that drains into a stream.

Well Injection: The subsurface emplacement of fluids into a well.

Well Monitoring: Measurement by on-site instruments or laboratory methods of well water quality.

Well Plug: A watertight, gastight seal installed in a bore hole or well to prevent movement of fluids.

Wellhead Protection Area: A protected surface and subsurface zone surrounding a well or wellfield supplying a public water system to keep contaminants from reaching the well water.

Wetlands: An area that is saturated by surface or ground water with vegetation adapted for life under those soil conditions, as swamps, bogs, fens, marshes, and estuaries.

Wildlife Refuge: An area designated for the protection of wild animals, within which hunting and fishing are either prohibited or strictly controlled.

Wood-Burning-Stove Pollution: Air pollution caused by emissions of particulate matter, carbon monoxide, total suspended particulates, and polycyclic organic matter from wood-burning stoves.

Wood Treatment Facility: An industrial facility that treats lumber and other wood products for outdoor use. The process employs chromated copper arsenate, which is regulated as a hazardous material.

Working Level Month (WLM): A unit of measure used to determine cumulative exposure to radon.

Working Level (WL): A unit of measure for documenting exposure to radon decay products, the so-called "daughters". One working level is equal to approximately 200 picocuries per liter.

X Y Z

Xenobiote: Any biotum displaced from its normal habitat; a chemical foreign to a biological system.

Yard Waste: The part of solid waste composed of grass clippings, leaves, twigs, branches, and garden refuse.

Yellow-Boy: Iron oxide flocculent (clumps of solids in waste or water); usually observed as orange-yellow deposits in surface streams with excess iron content. (See: floc, flocculation.)

Z-list: OSHA's tables of toxic and hazardous air contaminants.

Zone of Saturation: (See: saturated zone.)

Zooplankton: Tiny aquatic animals eaten by fish.

United States Marine Corps

Base Realignment and Closure Business Plan



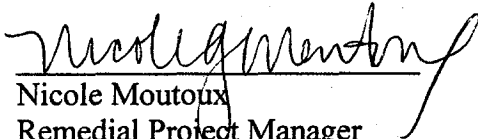
**For
Marine Corps Air Station
El Toro, CA**

March 2001

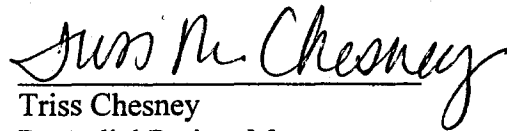
MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

BASE REALIGNMENT AND CLOSURE
(BRAC) BUSINESS PLAN

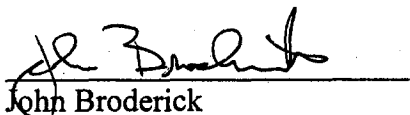
This BRAC Business Plan provides current summary information on the status of and strategies for the cleanup of the Marine Corps Air Station, El Toro. We, the BRAC Cleanup Team, with consideration of community and stakeholder advice, have cooperatively developed this plan to provide for safe, effective, timely, and cost-efficient environmental restoration and productive reuse of the closed DoD facility. This plan will be updated periodically to reflect new information regarding the environmental condition of property, reuse priorities, and availability of funds.




Nicole Moutoux
Remedial Project Manager
U.S. Environmental
Protection Agency



Triss Chesney
Remedial Project Manager
Cal-EPA, Department of
Toxic Substances Control



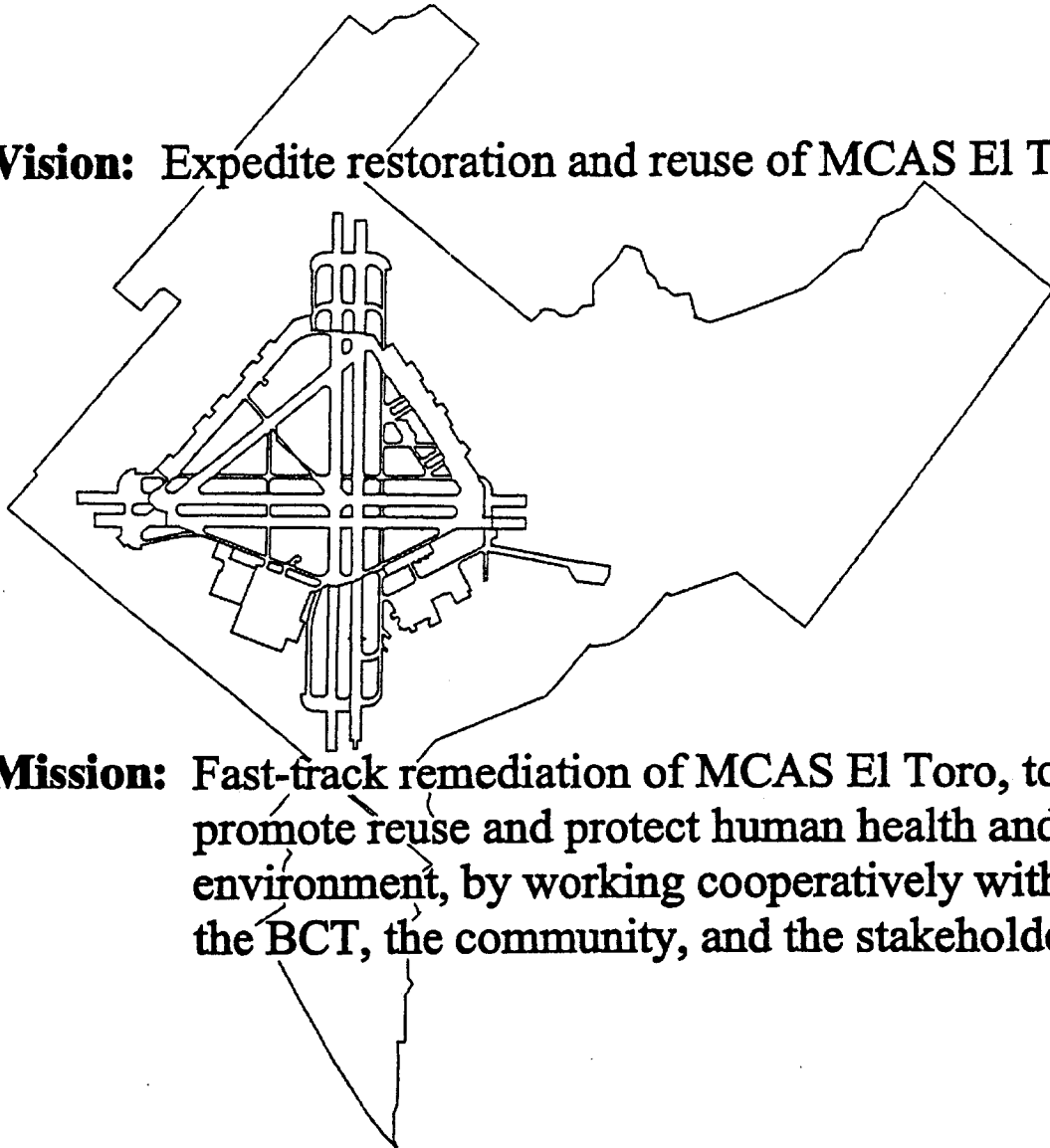
John Broderick
Remedial Project Manager
Regional Water Quality
Control Board, Santa Ana Region



Dean Gould
BRAC Environmental Coordinator
MCAS El Toro

Vision and Mission Statements

Vision: Expedite restoration and reuse of MCAS El Toro.



Mission: Fast-track remediation of MCAS El Toro, to promote reuse and protect human health and the environment, by working cooperatively with the BCT, the community, and the stakeholders.

TABLE OF CONTENTS

	Page
INTRODUCTION	1
STATUS OF DISPOSAL, REUSE, AND INTERIM LEASE PROCESS	2
STATUS OF ENVIRONMENTAL RESTORATION PROGRAM	4
INITIATIVES FOR ACCELERATING CLEANUP	10
SUMMARY OF CURRENT AND PLANNED BCT ACTION ITEMS	13
SCHEDULE/CRITICAL MILESTONES	14

EXHIBITS

- 1 Environmental Condition of Property (ECP) Types
- 2 Location of Concern Distribution
- 3 Distribution of 881 LOCs
- 4 New Sites Added During 2000 and Phantom Sites Deleted During 2000

TABLES

- 1 BCT Project Team Action Items
- 2 Installation-Wide Environmental Program Status – Site Status by LOC Type
- 3 Installation-Wide Environmental Program Status – Site Status by Reuse Parcel
- 4 Asbestos-Containing Materials
- 5 Critical Environmental Restoration Program and Selected Property Disposal Milestones
- 6 Installation Restoration Program, Approximate Historical Expenditures by Site

INTRODUCTION SECTION

NOTE: The Introduction Section serves as an “Executive Summary” of the complete document. To look at tables, figures and attachments referenced in the Introduction, please consult the complete document. It is available at two locations: (1) the Administrative Record File, located at MCAS El Toro, Base Realignment and Closure Office, Building 368 – contact Ms. Charly Wiemart at (949) 726-2840 to arrange an appointment; (2) the MCAS El Toro Information Repository located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, phone number (949) 551-7151.

TABLE OF CONTENTS (continued)

FIGURES

- 1 MCAS El Toro Location Map
- 2 Preferred Land Use Plan
- 3 Preferred Land Use Plan Summary
- 4 Installation Restoration Program Site Locations
- 5 Underground Storage Tank Site Locations
- 6 Oil/Water Separator Site Locations
- 7 Above-Ground Storage Tank Site Locations
- 8 Petroleum Exclusion Site Locations
- 9 Aerial Photograph Anomaly (APHO) Site Locations
- 10 Temporary Accumulation Area Locations
- 11 Solid Waste Management Unit Locations
- 12 Other Locations of Concern
- 13 Installation Restoration Program Sites and Preferred Land Use Plan
- 14 Environmental Condition of Property – Soil
- 15 Environmental Condition of Property – Groundwater
- 16 Radiological Survey Sites

ATTACHMENTS

- 1 List of Acronyms
- 2 List of Decision Documents

INTRODUCTION SECTION

NOTE: The Introduction Section serves as an "Executive Summary" of the complete document. To look at tables, figures and attachments referenced in the Introduction, please consult the complete document. It is available at two locations: (1) the Administrative Record File, located at MCAS El Toro, Base Realignment and Closure Office, Building 368 – contact Ms. Charly Wiemart at (949) 726-2840 to arrange an appointment; (2) the MCAS El Toro Information Repository located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, phone number (949) 551-7151.

INTRODUCTION

The Department of the Navy (DoN) completed the realignment and closure of Marine Corps Air Station (MCAS) El Toro (Station) on 2 July 1999, in accordance with the Base Realignment and Closure Act (1993) (BRAC III). In 1993, the DoN organized a Base Realignment and Closure (BRAC) Cleanup Team (BCT) to manage and coordinate closure activities and to prepare an annual BRAC Cleanup Plan (BCP). The DoN published the initial BCP in 1994 and issued annual updates in 1995, 1996, 1997, 1998, and 1999. In 1999, the BCT agreed to publish a BRAC Business Plan (Business Plan) for the Year 2000 update. The DoN established the Business Plan, a ten to fifteen page document that is comparable to an extended executive summary, as an alternative to the BCP for installations with continuing environmental restoration programs. The Business Plan provides the status of, management and response strategies for, and action items related to the environmental restoration and compliance programs at MCAS El Toro. The Business Plan presents information available as of 31 December 2000, and describes the most significant environmental Locations of Concern, the acceleration initiatives implemented at MCAS El Toro, and BRAC projects under way. Exhibits, tables, and figures provide additional information pertaining to the environmental Locations of Concern.

The scope of the Business Plan considers the following regulatory mechanisms:

- BRAC III;
- National Environmental Policy Act (NEPA);
- Resource Conservation and Recovery Act (RCRA);
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act and the Community Environmental Response Facilitation Act (CERFA); and
- other applicable state and local laws.

MCAS El Toro was listed on the National Priorities List under CERCLA in February 1990, and the DoN, the United States Environmental Protection Agency, Region 9, the California Department of Health Services (part of which is now the California Department of Toxic Substances Control), and the California Regional Water Quality Control Board, Santa Ana Region entered into a Federal Facilities Agreement (FFA) which establishes a procedural framework and schedule for developing, implementing, and monitoring appropriate response actions. The Business Plan is a planning document; therefore, the information and assumptions presented may not have complete approval from the federal and state regulatory agencies. The Business Plan is a dynamic document that is updated regularly to reflect the current status of response actions and the changes in strategies or plans that affect the ultimate restoration and disposal of MCAS El Toro property. Comments from various sources, including major claimants, DoN activities, and federal and state regulatory agencies, were evaluated and considered for inclusion during the preparation of this Business Plan.

STATUS OF DISPOSAL, REUSE, AND INTERIM LEASE PROCESS

In March 1994, the County of Orange (County), along with the Cities of Irvine and Lake Forest, formed a joint powers authority to develop a reuse plan for MCAS El Toro. In January 1995, the County withdrew from the joint powers authority in response to the passage of Measure A, a countywide ballot initiative approved by Orange County voters in November 1994. Measure A anticipates that the principal feature of a County-adopted reuse plan for MCAS El Toro should be a commercial airport. Measure A also established the 13-member El Toro Airport Citizens Advisory Commission to advise the Board of Supervisors and Orange County Planning Commission on base reuse.

In April 1995, the Office of Economic Adjustment formally recognized the Orange County Board of Supervisors as the official Local Redevelopment Authority (LRA) for MCAS El Toro. As the recognized LRA, the Board of Supervisors was given sole responsibility for preparing a Community Reuse Plan (CRP) for submittal to the DoN. Eight Department of Defense (DoD) and federal agencies submitted formal applications for MCAS El Toro property during the federal screening process.

The LRA provided its recommendations on each of these requests to the Assistant Secretary of the Navy in early 1995. The LRA has endorsed requests by the Department of Interior (DOI) for the Habitat Reserve, the Federal Aviation Administration, and the California Air National Guard. The LRA recommended that the remaining requests be denied. No surplus property determination has been made. Currently, no transfer actions have been approved by the Assistant Secretary of the Navy.

In the March 1995 final Environmental Baseline Survey (EBS) Report (Jacobs Engineering Group, 1995), approximately 63 percent of the total 4,738 acres of real property at the Station was categorized as eligible under CERFA for transfer as uncontaminated property or Environmental Condition of Property (ECP) Type 1. ECP types are described in Exhibit 1.

Exhibit 1. Environmental Condition of Property (ECP) Types

ECP Type	Description
1	Areas where no release or disposal of hazardous substances or petroleum products (including migration) has occurred.
2	Areas where only release or disposal of petroleum products has occurred.
3	Areas of contamination below action levels.
4	Areas where all remedial action has been taken.
5	Areas of known contamination with removal and/or remedial action underway.
6	Areas of known contamination where required response actions have not been implemented.
7	Areas that are unevaluated or that require further evaluation.

Since the 1995 EBS, additional property has been categorized as area type 1. Property designated as area types 1 through 4 is environmentally suitable for transfer by deed. This property type now totals approximately 87 percent of the Station property. The remaining real property is identified as area types 5, 6, and 7. The real extent of land classified as area types 5,

6, and 7 is approximately 252 acres (5 percent), 323 acres (7 percent), and 3 acres (less than 1 percent), respectively.

In the fall of 1995, the LRA conducted the state/local and homeless provider screening process in accordance with the Base Closure Community Redevelopment and Homeless Assistance Act of 1994 and implementing regulations issued by the DoD and the U.S. Department of Housing and Urban Development (HUD) in August 1995.

The LRA prepared a final CRP and draft Environmental Impact Report (EIR), which evaluated three reuse alternatives for the Station. Reuse Alternative A - Commercial Passenger/Cargo Use (the proposed project) - provided for a full service commercial passenger and cargo airport and compatible non-aviation uses. Reuse Alternative B -Cargo/General Aviation Use - provided for a cargo and general aviation airport and compatible non-aviation uses. Reuse Alternative C - Non-aviation-provided for non-aviation uses including an educational campus, visitor-oriented attractions, research and development, and other uses.

In August 1996, the LRA issued the draft MCAS El Toro CRP, Homeless Assistance Submission (HAS) and draft EIR for a 67-day public review and comment period. The written public comment period ended on 15 October 1996. In the fall of 1996, the Orange County Airport Commission, the El Toro Airport Citizens Advisory Commission, and the Orange County Planning Commission conducted public meetings/hearings and adopted recommendations to the Board of Supervisors on the draft CRP, HAS and EIR.

On 11 December 1996, the Board of Supervisors adopted the final MCAS El Toro CRP (P&D Consultants Team, December 1996), which provides for a more detailed study of a full-service commercial passenger and cargo airport, as well as compatible non-aviation uses.

The final CRP also incorporates the LRA's previously transmitted recommendations on each of the DoD and federal agency requests for property at the base and the 47 Notice Of Interest applications submitted during the state/local and homeless provider screening process conducted by the LRA. The final CRP and HAS were submitted to the Assistant Secretary of the Navy and the Secretary of HUD on 13 December 1996.

The scheduling and prioritizing of parcels for reuse based on the final CRP was provided by the LRA in 1997. The closure programs summarized in this Business Plan are not anticipated to be adversely impacted by the LRA's parcel prioritization schedule.

The Bake Parkway/Interstate 5 public highway expansion project was completed and resulted in the transfer of approximately 25 acres of MCAS El Toro property in 1998.

In June 1999, Cooperative Agreement N68711-99-2-6504 for caretaker services to protect, secure, and maintain MCAS El Toro was executed with the County of Orange, extending through 31 August 2000. The expiration of the cooperative agreement for caretaker services was concurrent with the execution of a Master Lease, effective 31 August 2000.

DoN prepared a Finding of Suitability to Lease (FOSL) and entered into an interim lease with the County of Orange in July 1999 for post-closure use of the following areas: the Golf Course (approximately 225 acres); the Child Development Center (Buildings 656 and 873); the Officers' Club (Building 791); the Horse Stables (approximately 30 acres); the Recreational Vehicle (RV) Storage Area; the Indoor Training Pool (Building 839); and Building 83. The areas addressed in this lease were incorporated into the Master Lease that was executed on 31 August 2000. The Master Lease has a term of five (5) years beginning on 1 September 2000, and the terms and conditions of the Master Lease are identified in *the Interim Lease Between The United States of America and County of Orange, California For Property at Marine Corps Air Station, El Toro* dated 31 August 2000.

The County of Orange identified a detailed proposed reuse plan for MCAS El Toro in the Draft Environmental Impact Report (EIR 573) in December 1999, and the proposed future land uses are identified on Figure 2 of this Business Plan.

STATUS OF ENVIRONMENTAL RESTORATION PROGRAM

A total of 881 environmental Locations of Concern (LOCs), including twenty-four (24) Installation Restoration Program Sites (Sites), have been identified at MCAS El Toro. A LOC is defined as any identified location or area that is potentially contaminated or is a potential source of contamination. Several new LOCs were added to the program during 2000: Underground Storage Tank (UST) 324G, Above-ground Storage Tank (AST) 1, AST 730, AST 374A, AST 374B, AST 374C, AST 374D, and AST 374E.

Seven (7) LOCs were deleted from the program as phantom or non-existent LOCs. Record search activities, visual inspections, and cognizant regulatory agency concurrence were documented prior to deleting the LOCs from the program. Regulatory agency correspondence pertaining to the phantom LOCs has been placed in the Administrative Record. Deleted were the following LOCs: UST 473A, UST 374B, UST 5101, TAA 29A, TAA 29B, OWS 850, and OWS 851.

Exhibits 2, 3 and 4 summarize the types, numbers, and status of different LOCs at the Station.

**Exhibit 2 - Location of Concern Distribution
(as of 31 December 2000)**

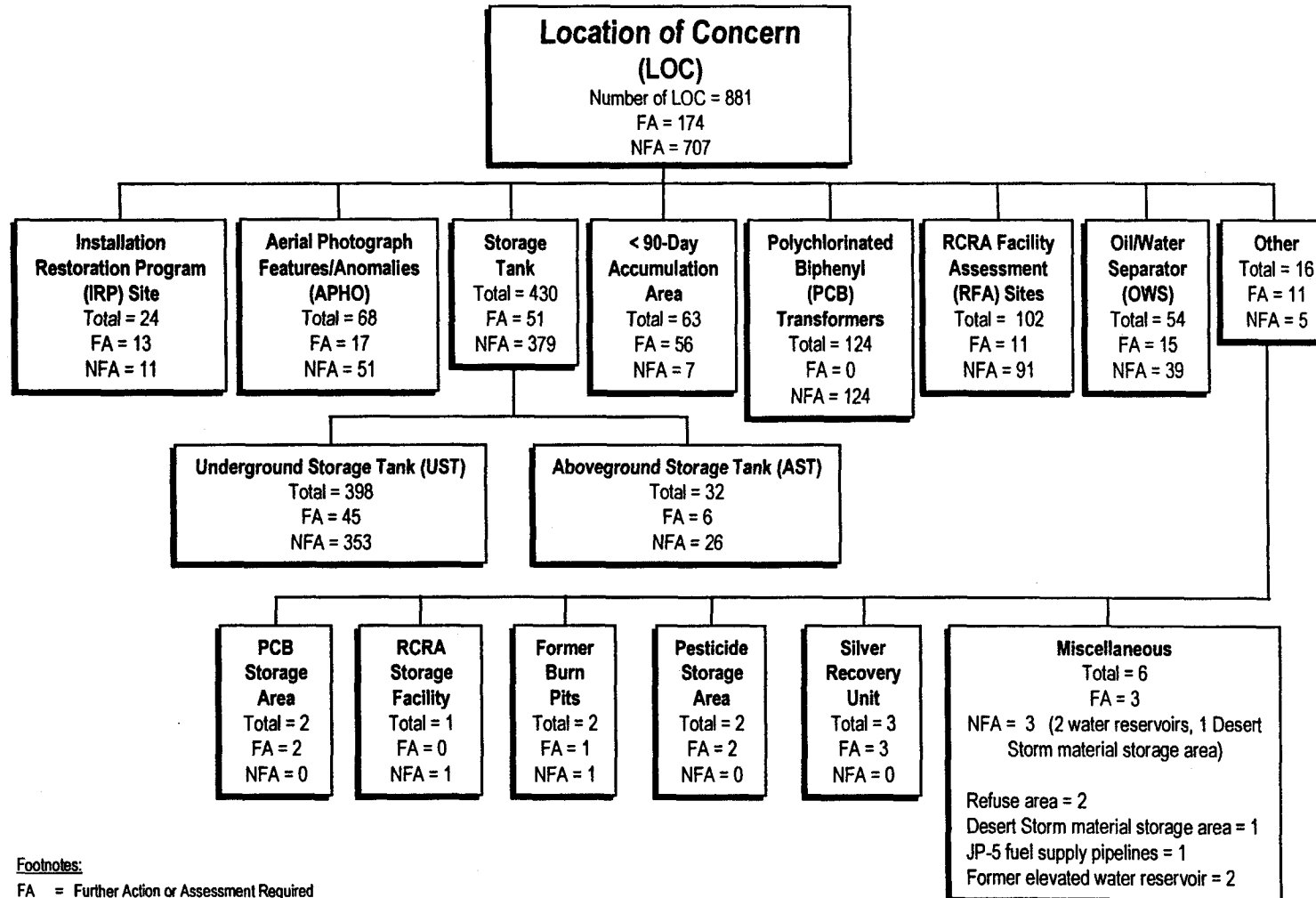


Exhibit 3 – Distribution of 881 LOCs (as of 31 December 2000)

	IRP SITES	APHO SITES	STORAGE TANK SITES	<90-DAY ACCUMU- LATION AREAS (TAAs)	PCB TRANS- FORMERS	RFA SITES	OIL/WATER SEPARATOR SITES	OTHER
TOTAL	24	68	430	63	124	102	54	16
NFA	11	51	379	7	124	91	39	5
Further Action Required (includes LOCs with NFA Decision Documents in Review or In Development)	13	17	51	56	0	11	16	11

Exhibit 4 – New Sites Added during 2000 and Phantom Sites Deleted during 2000

Description	APHO SITES	UNDER- GROUND STORAGE TANKS	ABOVE- GROUND STORAGE TANKS	<90-DAY ACCUMU- LATION AREAS (TAAs)	RFA SITES	OIL/WATER SEPARATOR SITES
New Sites	0	1	7	0	0	0
Phantom Sites	0	3	0	2	0	2

Historical Environmental Program Highlights. The following accomplishments highlight the progress of environmental restoration activities at MCAS El Toro:

- Agency concurrence of a No Action Record of Decision (ROD) for eleven sites from OU-3 and OU-2A (Sites 4, 6, 9, 10, 13, 15, 19, 20, 21, 22, and 25) in September 1997 and agency concurrence on the ROD for Site 11 in September 1999;
- Agency concurrence on the OU-2A interim ROD for the vadose zone at Site 24 in September 1997;
- Agency concurrence on the OU-2B interim ROD for Sites 2 and 17 in July 2000;
- Agency approval of the polynuclear aromatic hydrocarbon (PAH) Reference Study (prepared by Bechtel National Incorporated in 1996) that allowed the recategorization of 448 acres of land from area type 7 to area type 3, thus allowing this land to be transferable by deed; and
- Completion of two time-critical removal actions at Sites 2 and 17 and one non-time-critical removal action at Site 19.

Installation Restoration Program. Currently, a total of 24 sites are being investigated in the Installation Restoration Program (IRP) at the Station (Sites 1 through 22, 24, and 25). Of these, 22 sites were evaluated during the Phase I RI, which was completed in May 1993. Two additional sites were established for investigation in Phase II, bringing the total number of IRP sites to 24. These sites are grouped into three OUs: OU-1, OU-2, and OU-3. The following is a brief summary of the site groupings, current status, and FFA schedule for each of the three OUs.

- OU-1 addresses contaminated groundwater on- and off-Station and consists of one IRP site (**Site 18**). The final interim RI/FS report for OU-1 was submitted in August 1996. The Interim Draft Final Proposed Plan was submitted to the BCT in August 2000.
- OU-2 consists of three subunits (OU-2A, OU-2B, and OU-2C) and addresses potential source areas of groundwater contamination.
 - **OU-2A:** OU-2A includes Site 24 (the Volatile Organic Compound (VOC) Source Area) and Site 25 (the Major Drainages). **Site 24:** RI and Draft Phase II FS Reports for Site 24 were submitted in June and August 1996, respectively. Site 24 – the Volatile Organic Compound (VOC) Source Area – encompasses approximately 200 acres in the southwestern section of the Station. The planned reuse for Site 24 is cargo storage. The VOCs at Site 24 may have come from solvents containing trichloroethene (TCE) or perchloroethene (PCE) that were used at Site 24 until approximately 1975. Primary sources include degreaser tanks, storm drains and industrial waste sewers, and washracks. Pilot studies utilizing portable soil vapor extraction (SVE) treatment units were conducted during the period from approximately 1996 through 1998. The interim ROD (vadose zone only) for Site 24 was signed in September 1997, implementation of the final remedy – SVE treatment - commenced in 1999, and confirmation sampling of the vadose zone was completed in 2000. The ROD for OU-2A and OU-1, which will finalize the remedial decision and will address groundwater, is scheduled to be prepared in the year 2001. **Site 25:** The Draft Final ROD for no action was signed in 1997.
 - **OU-2B:** OU-2B addresses inactive landfill **Site 2** (Magazine Road Landfill) and **Site 17** (Communication Station Landfill). Sites 2 and 17 are located in the northeastern section of the Station in an area designated for future use as a habitat reserve. The former operational landfill units at Site 2 encompass approximately 27 acres, and the former operational landfill unit at Site 17 encompasses approximately 11 acres. Solid wastes from MCAS El Toro were disposed of at Sites 2 and 17. Suspected types of wastes include construction debris, municipal-type waste from Station operations, and oils and fuels. TCE and PCE have been detected in the groundwater at Site 2. The Draft Final Phase II RI and draft FS Reports were both submitted in September 1996. Draft Final FS reports were submitted in September 1997,

and a Draft Proposed Plan was submitted to the BCT in November 1997. The Draft Proposed Plan identified the preferred remedy for the former operational landfill areas at Sites 2 and 17 - a four-foot thick single-layer soil cover. The preferred alternative is based upon U. S. EPA's presumptive remedy approach to landfills. The Proposed Plan was provided for public review in May 1998. The Draft ROD was submitted in October 1998 to the BCT for review, and the Final Interim ROD was signed in July 2000. The Final ROD, a future document, will address management of the VOC plumes at Site 2.

- **OU-2C:** OU-2C addresses inactive landfill **Site 3 (Original Landfill)** and **Site 5 (Perimeter Road Landfill)**. Site 3 encompasses approximately 11 acres in the northeastern section of the Station. Site 5 encompasses approximately 1.8 acres in the southeastern section of the Station. Site 3 is designated for future reuse as a park, and Site 5 is designated for future reuse as a golf course. Reportedly, any waste generated on the Station could have been disposed of at these sites. The wastes are likely to have included municipal solid waste, fuels, and solvents. Site 3 included an incinerator, and incinerator ash was probably disposed of within the landfill. The Draft Final Phase II RI Reports were submitted in October 1996, and the Draft Final FS reports were submitted in September 1997. Based on BCT concurrence with the FS reports, a Draft Proposed Plan was submitted to the BCT in November 1997 and to the public in May 1998. The Proposed Plan identified the preferred remedy for the former operational landfill areas at Sites 3 and 5 - a four-foot thick single-layer soil cover. The preferred alternative is based upon U. S. EPA's presumptive remedy approach to landfills. Following the receipt of public comments, the preferred remedy was changed to a single-barrier cap with a two-foot foundation layer, a flexible membrane liner (FML), and a two-foot soil cover. The single-barrier cap design allows for future irrigation of the landfill cover. The Draft ROD was completed in March 1999, and the Draft Final ROD is expected to be completed in the year 2001.
- **OU-3** addresses the remaining sites and information pertaining to the suspected types of wastes at each OU-3 site is presented in Tables 2 and 3. Portions of three sites (**Sites 15, 19, and 20**) are no longer part of the IRP; they have been withdrawn via the CERCLA petroleum exclusion and are managed with state or local environmental program oversight. **Sites 4, 6, 9, 10, 13, 15, 19, 20, 21, and 22** were addressed in the ROD for no action sites in 1997. **Site 1** is in the remedial investigation/feasibility study phase, and a draft Work Plan for the Phase II Remedial Investigation was completed in September 2000. A Proposed Plan recommending no action as the final remedy was issued for **Sites 7 and 14 (Operable Unit 3B)** in September 2000, a Public Meeting was held in October 2000, and the Draft ROD was completed in November 2000. A Draft Final ROD for **Sites 8 and 12** is in development. **Site 11** is in the remedial design/remedial action phase. A pilot study for multi-phase extraction was initiated at **Site 16** in October 2000,

and the results of the pilot study will be incorporated into the Draft Final Feasibility Study for Site 16.

RCRA Facility Assessment Sites. A RCRA Facility Assessment (RFA) was performed at the Station between 1990 and 1993. The RFA included the investigation of 305 solid waste management units (SWMUs)/areas of concern (AOCs). However, 3 units were located at MCAS Tustin, 15 units were duplicates of other SWMUs/AOCs, and 4 SWMUs/AOCs were researched and identified as phantom sites. Of the remaining 283 SWMUs/AOCs, 140 were included in a sampling effort. The RFA report was approved by DTSC contingent upon performance of additional investigation at 14 SWMUs/AOCs. A final addendum to the RFA report was completed on 31 May 1996. The addendum presents results and recommendations for the 14 SWMUs/AOCs and recommends closure strategies for 73 temporary accumulation areas. The status of SWMUs/AOCs, as presented in the RFA documentation, is summarized as follows:

- 8 addressed in the IRP;
- 1 addressed in the PCB category of LOCs;
- 76 addressed as USTs;
- 30 addressed as OWSs;
- 66 addressed as Temporary Accumulation Areas (TAAs); and
- 102 addressed as RFA sites, of which 14 required further action or assessment.

The number of SWMUs/AOCs (283) is greater than the number of RFA sites indicated in Exhibit 2, because some LOCs have been designated as both SWMUs/AOCs and as other types of LOCs. For example, there are USTs that have been identified as SWMUs/AOCs and there are TAAs that have been identified as SWMUs/AOCs. Exhibit 2 refers to these SWMUs/AOCs as USTs or TAAs instead of as RFA sites.

Compliance Program Sites and Other LOCs. There are several compliance programs in progress at MCAS El Toro that involve different types of LOCs including USTs, less-than-90-day accumulation areas, polychlorinated biphenyl (PCB)-containing transformers, and oil/water separators. The status of each of these types of LOCs is summarized as follows:

Status of USTs (Total: 398 sites):

- 353 No Further Action sites (88%);
- 45 sites with work in progress (11%).

Status of ASTs (Total: 32 sites):

- 26 No Further Action sites (81%);
- 6 sites with work in progress (19%).

Status of Aerial Photograph Anomaly (APHO) Sites (Total: 68 sites):

- 51 No Further Action sites (75%);
- 17 sites with work in progress (25%).

Status of Less-Than-90-Day Accumulation Areas and Resource Conservation and Recovery Act Facility Assessment (RFA) Solid Waste Management Units (165):

- 98 No Further Action sites (59%);
- 67 sites with work in progress (41%).

Status of PCB-Containing Transformers: 124 No Further Action sites (100%).

Status of Oil/Water Separators (Total: 54 sites):

- 39 No Further Action sites (72%); and
- 15 sites with work in progress (28%).

The status of the remaining types of LOCs (PCB storage sites, burn pits, silver recovery units, JP-5 pipeline, pesticide storage sites, and other sites) is shown on Exhibit 2. Business Plan updates will continue to summarize both the number and status of all LOCs at MCAS El Toro.

INITIATIVES FOR ACCELERATING CLEANUP

The BCT conducted a "bottom up" review of the environmental programs at MCAS El Toro in accordance with DoD guidance on establishing BCTs (DoD 1993). During the review process, the following nine issues were addressed to identify opportunities for accelerating cleanup activities necessary to facilitate conveyance of real property at the Station.

1. **Technology Review.** Publications such as Treatment Technologies Applications Matrix for Base Closure Activities, prepared by the California Base Closure Environmental Committee, dated November 1994 (CBCEC 1994a) and the latest information from the United States and California Environmental Protection Agencies (U.S. EPA and Cal-EPA) and DoD will be reviewed as part of the evaluations performed in selecting technologies.
2. **Removal Actions.** A UST Tiger Team addressed compliance and closure issues related to USTs on-Station during the 1995-1997 time period, and the Tiger Team worked to identify USTs that could be taken out of service without adversely impacting Station operations. All tanks within the former Tank Farms 1, 2, 3, 4, 5, and 6 have been removed, and most of the tank sites have been closed by the regulatory oversight agencies. Soil vapor extraction (SVE) technology was utilized to remediate the vadose zone at Tank Farm 2, and the vadose zone release was closed by the Regional Water Quality Control Board, Santa Ana Region in March 2000. SVE systems were utilized to remediate vadose zone releases of petroleum hydrocarbons at Former UST Sites 651-1, 651-2, 651-3, and 651-4 (UST Group 651) and at Former UST Site 364A during 2000, and a bioventing pilot test was initiated at Tank Farm 555 during 2000.

Two time-critical removal action memoranda were submitted for public review in

October 1996 for IRP Sites 2 and 17 (former landfills), for public safety and to abate erosion of landfill materials. The removal actions were completed in 1997. A non-time-critical action memorandum was also submitted for public review in October 1996 for IRP Site 19 (Unit 2). These removal actions were designed to reduce the risk to human health and the environment and to expedite cost-effective cleanup.

A pilot study utilizing multi-phase extraction for remediation of a combined petroleum hydrocarbon and chlorinated solvent release was initiated at Site 16 during October 2000.

3. **Clean Properties.** A basewide EBS for MCAS El Toro was submitted to the United States Environmental Protection Agency (U.S. EPA) and California Environmental Protection Agency (Cal-EPA) on 1 April 1995. The Navy, Marine Corps, and regulators have concurred on the designation of area type 1 parcels as Environmental Condition of Property, Category 1. The EBS designated approximately 3,088 acres of land as Environmental Condition of Property, Category 1. Review of information available since April 1995 indicates that approximately 3,175 acres of land are currently Environmental Condition of Property, Category 1. The BCT and the LRA will work together to determine how to transfer properties expeditiously.
4. **Overlapping Phases.** As an ongoing effort, the BCT will continue to identify phases of the cleanup process that can be overlapped to reduce the time required for completion. Areas of overlap at MCAS El Toro include the following:
 - the RFA was conducted concurrently with the Phase I RI during the period from 1991 through 1994;
 - Phase II RI/FS activities for the volatile organic compound (VOC) source area, landfills, and OU-3 sites were conducted simultaneously during the period from approximately 1995 through 1997;
 - Integration of Comprehensive Long-Term Environmental Action Navy (CLEAN)/Remedial Action (RAC) and other contractors to facilitate the design and implementation of field work has occurred and continues to occur during the remediation of the vadose zone and groundwater at Site 24; and
 - Planning for additional demonstration projects for groundwater remediation at Site 24 and other sites to facilitate site remediation during the development of the Records of Decision.
5. **Contracting Procedures.** SWDIV management of the CLEAN, RAC, and indefinite-quantity contracts has been based on a cooperative and interactive approach, and the following contractors have participated in environmental restoration and/or compliance program projects during 2000: ARINC; Bechtel National, Incorporated; CDM Federal Programs Corporation; Earth Tech; Foster

Wheeler; Geofon; Law-Crandall; The IT Group; and Roy F. Weston. Active participation by the Project Team results in a bias for action.

6. **Community Reuse Interface.** In an effort to carry out strategies for environmental restoration activities, while assuring proactive community involvement, the Station has adopted an approach to meet the needs of the public as well as the requirements of NEPA, CERCLA, CERFA, and the California Health and Safety Code Section 25356.1. The approach provides for a number of services to inform interested parties (e.g., the city of Irvine, the city of Lake Forest, and the County of Orange) of environmental restoration activities while maintaining a commitment for efficient and cost-effective cleanup at MCAS El Toro.
7. **Bias for Cleanup.** The BCT will continue to emphasize expedited remedial actions and attempt to avoid lengthy site characterization studies and prolonged RI/FS activities. As such, the BCT members will continue to collaborate in devising work plans, identifying cleanup criteria, and selecting remedial actions in an effort to aggressively pursue cleanup instead of studies and data collection. Acceleration of ongoing or future cleanup activities will continue to be in strict compliance with applicable rules, regulations, and public health and safety requirements. Remediation strategies and plans for cleanup activities have been shared with representatives from the known or anticipated reuse organizations including technical, operational, reuse, and administrative specialists.
8. **Presumptive Remedies.** Presumptive remedies are preferred technologies for common categories of sites, based on previous remedy selection and U.S. EPA scientific and engineering evaluation of performance data on technology implementation. The presumptive remedy approach is one tool used to accelerate cleanup under the Superfund Accelerated Cleanup Model. Presumptive remedies are expected to assure consistency in remedy selection and reduce time and cost required to clean up similar types of sites. Currently, presumptive remedies are recognized by U.S. EPA for VOC remedies and municipal and military landfill remedies. Presumptive remedies have been selected for the four landfill sites (Sites 2, 3, 5, and 17) and the VOC source area (Site 24).
9. **Partnering.** A partnering agreement among the Project Team is essential for efficient management of the base closure process. The following team charter agreement for MCAS El Toro was developed during a team-building seminar held in October 1994.

“We, the MCAS El Toro partners, commit to effectively working together to maximize restoration and reuse of MCAS El Toro by 1999. We will accomplish this goal through teamwork, dedicated and focused participation, our ethics outlined below, and effective communication between all partners.

We want the project to be enjoyable to work on and will work together with trust and respect, and will ensure that all team members' interests impact decisions. Problems will be resolved quickly or escalated if appropriate by team members closest to the issue. As partners, we commit to communicating our mission and partnership goals to new project members and encourage them to embrace this partnership.

Our mutually agreed upon ethical standards are listed below.

CODE OF ETHICS

Integrity	Objectivity	Trust	Dependability
Leadership	Accountability	Sincerity	Credibility
Empathy	Candor	Responsibility	Honesty

Additionally, we will listen to and value others' opinions, honor diversity, model the behavior we expect from others, and have fun."

Through meetings and conference calls, the BCT has worked together as a team to discuss and resolve issues related to environmental restoration activities at MCAS El Toro with a focus on expediting reuse while protecting human health and the environment.

SUMMARY OF CURRENT AND PLANNED BCT ACTION ITEMS

The BCT has coordinated and managed a number of tasks relating to the BRAC cleanup activities at MCAS El Toro during the past year. A brief list of accomplishments for 2000 includes:

Environmental Program Highlights for 2000.

- Conducted six (6) Restoration Advisory Board (RAB) meetings addressing a vast array of issues of public interest and one public meeting for Sites 7 and 14 during 2000;
- Continued progress on an agreement between Orange County and Irvine Ranch Water Districts and the United States (represented by the Department of Justice (DOJ)) in support of a multipurpose project to remediate regional groundwater contaminated with volatile organic compounds;
- Conducted CERCLA groundwater monitoring activities and investigated perchlorates and radionuclides in groundwater;
- Signed the draft Final Interim ROD for Sites 2 and 17;
- Completed Final Historical Radiological Assessment (HRA) and the Draft Final Survey Plan for the Radiological Survey;
- Completed the vadose zone confirmation sampling activities at Site 24;
- Commenced operation of Soil Vapor Extraction (SVE) treatment systems at UST Group 651 and former UST Site 364A;
- Constructed bioventing well and monitoring points for pilot test and began pilot test at Tank Farm 555;

- Achieved regulatory closure of 38 USTs (353 USTs to date) and removed 19 inactive USTs during calendar year 2000;
- Conducted removal of inactive OWSs and ASTs and conducted cleaning, testing, and closure of primary JP-5 pipelines; and
- Conducted site verification sampling activities at UST sites, AST sites, OWS sites, and aerial photograph anomaly (APHO) sites, and completed closure documentation for more than 50 LOCs.

Planned Goals for Year 2001:

- Sign the agreement between Orange County and Irvine Ranch Water District and the DOJ in support of a multipurpose project to remediate regional groundwater contaminated with volatile organic compounds;
- Issue the Proposed Plan for Sites 18 and 24 for public comment;
- Issue the Draft ROD for Sites 18 and 24 for public comment;
- Issue the Proposed Plan for Site 16 for public comment;
- Issue the Draft ROD for Site 16 for public comment;
- Complete Draft Final RODs for Sites 3 and 5;
- Conduct radiological surveys;
- Initiate soil sampling activities for lead-based paint at the housing areas;
- Continue coordination with United States Fish and Wildlife Service, the LRA, and the BCT during the design of landfill covers for Sites 2 and 17;
- Procure services for the design of landfill covers for Sites 3 and 5;
- Continue groundwater monitoring activities and evaluation of groundwater data; and
- Conduct the site verification and/or remediation activities at UST, OWS, AST, fuel pipeline, and APHO sites.

Table 1 provides a list of recommendations and issues associated with the environmental restoration and compliance programs that require further evaluation and action by the BCT. The list covers key items identified during the course of the Business Plan preparation and includes the BCT activities relating to the base closure.

Tables 2 and 3 identify the status of each LOC as of 31 December 2000, and Table 4 identifies the buildings with known asbestos. The current reuse parcel identifier, for the Concept B Reuse Plan of 1999, is included for each LOC in Tables 2 and 3. Figures 1, 2, and 3 show the vicinity of the Station and information pertaining to the most current reuse plan (preferred land use plan (Concept B)). Figures 4 through 12 show each type of LOC, Figures 13 and 14 show the environmental condition of property, and Figure 15 shows the IRP Site boundaries with the preferred land use plan, and Figure 16 shows the radiological survey sites.

SCHEDULE/CRITICAL MILESTONES

The Installation Restoration Program milestones are identified in the Federal Facilities Agreement (FFA) for the Marine Corps Air Station, El Toro. The FFA schedule is usually revised or updated three or more times per year.

Critical milestones for the environmental restoration program are presented in Table 5. Historical information pertaining to the expenditures for each Installation Restoration Program Site and cost to complete estimates are presented in Table 6.

INTRODUCTION SECTION

NOTE: The Introduction Section serves as an "Executive Summary" of the complete document. To look at tables, figures and attachments referenced in the Introduction, please consult the complete document. It is available at two locations: (1) the Administrative Record File, located at MCAS El Toro, Base Realignment and Closure Office, Building 368 – contact Ms. Charly Wiemart at (949) 726-2840 to arrange an appointment; (2) the MCAS El Toro Information Repository located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, phone number (949) 551-7151.



Environmental Compliance Program Documentation Update (13 September 2001)

Underground Storage Tank (UST) Sites, Resource Conservation and Recovery Act
Facility Assessment (RFA) Sites, and other Locations of Concern
Former Marine Corps Air Station, El Toro

Regulatory Submittals

Site Identification	Date of Submittal	Title of Submittal and Lead Regulatory Oversight Agency
RFA Sites	10 September 2001	Responses to DTSC Comments dated 3 and 10 July 2001 on the Addendum to the Supplemental Work Plan - DTSC
UST Group 651	4 September 2001	UST Group 651 Groundwater Aquifer Pumping Test - RWQCB
Jet Fuel Pipelines, MSC JP5, Units 4, 5, 6, 7, and 8	29 August 2001	Testing and Physical Closure Procedures - RWQCB
Tank Farm 555	27 August 2001	Bioventing Pilot Test - RWQCB
UST 1B, UST 98A, and USTs 390A&B	24 August 2001	SVE Testing Activities - RWQCB
TAA 626	15 August 2001	Summary Report - DTSC
APHO 38	7 August 2001	Responses to DTSC Comments
UST 315	30 July 2001	Summary Report - RWQCB
UST 314	27 July 2001	Technical Memorandum - RWQCB
SRU 3B	16 July 2001	Summary Report - DTSC
UST Group 651 and Former Tank Farm 555	2 July 2001	Routine Status Report - RWQCB
JP5 Pipeline, Units MSC JP5-1 and MSC JP5-3	29 June 2001	Closure Report - RWQCB
OWS 655C	20 June 2001	Site Assessment Report - RWQCB
SRU 3A	30 May 2001	Summary Report - DTSC
SWMU 88	23 May 2001	Closure Report - DTSC
Anomaly Area 5 APHO 31, APHO 43, APHO 66, APHO 67, APHO 68	11 May 2001	Addendum to Summary Report - DTSC

Recent Regulatory No Further Action (NFA) Determinations

Site Identification	Date of NFA Determination	Oversight Agency or Agencies
SRU 3A	10 September 2001	RWQCB letter dated 10 September 2001
SRU 3B	10 September 2001	RWQCB letter dated 10 September 2001
TAA 626	20 August 2001	DTSC letter dated 20 August 2001
TAA 307	17 July 2001	DTSC letter dated 17 July 2001
AST 753	9 February 2001	RWQCB letter dated 17 January 2001 DTSC letter dated 9 February 2001



MARINE CORPS AIR STATION, EL TORO

ENVIRONMENTAL COMPLIANCE AND INSTALLATION RESTORATION PROGRAMS

LOCATION OF CONCERN (LOC) STATUS TABLE (Updated 19 September 2001)

STATUS	USTs	ASTs	OWSs	APHOs	SWMU/ TAAs	MSC	PCB XFRMRS	IRP SITES
TOTAL (885)	399	35	54	68	165	16	124	24
NFA (723)	355	30	40	51	106 **	5	124	13
% Complete (80)	89	88	74	75	81	30	100	54
In Review (75)	27	4	7	14	20	3	0	0
In Progress (87)	17	1	7	3	40	8	0	11

EXPLANATION

NFA: No Further Action required

** includes 3 SWMUs with NFA determinations pending results of radiological survey.

MCAS El Toro

Installation Restoration Program

Status Update

September 19, 2001

Dean Gould

Base Realignment and Closure (BRAC)

Environmental Coordinator

MCAS El Toro

MCAS EL TORO
INSTALLATION RESTORATION PROGRAM

Installation Restoration Program Process - Key Steps

- Preliminary Assessment/Site Inspection (PA/SI)
- Remedial Investigation (RI), includes Risk Assessment
- Feasibility Study (FS)
- Proposed Plan
- Records of Decision (ROD)
- Remedial Design/Remedial Action (RD/RA)

-
- Complete Radiological Survey
 - If necessary, conduct radiological remediation activities
 - Issue Draft and Draft Final Radiation Reports for BCT review; issue Final Radiation Report

Page 2

MCAS EL TORO
INSTALLATION RESTORATION PROGRAM

Operable Units (OUs) at MCAS El Toro:

- **OU-1** (Site 18) addresses the VOC contamination in the regional groundwater that extends 3 miles west of the Station.
- **OU-2A** includes the VOC-contaminated soil and groundwater at Site 24, the VOC Source Area; and Site 25, the Major Drainage Channels at the Station.
- **OU-2B** (Sites 2 and 17) and **OU-2C** (Sites 3 and 5) address inactive landfill sites that were used for municipal-type and construction debris waste disposal.
- **OU-3** consists of the remaining Installation Restoration Program sites - Sites 1, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 21, and 22. [Results of PA/SI determined that Site 23, Former Industrial Waste Treatment Plant site, would not undergo a RI.]

Page 4

MCAS EL TORO
INSTALLATION RESTORATION PROGRAM

What are Operable Units or OUs?

- Marine Corps organized Installation Restoration Program sites into OUs to effectively manage the overall cleanup effort.
- OUs consist of sites where similar contamination exists and similar cleanup activities can be implemented.
- Each OU represents one component of the comprehensive Installation Restoration Program environmental investigation and cleanup effort.

Page 3

MCAS EL TORO
INSTALLATION RESTORATION PROGRAM

No Further Action Sites

OU-2A - Site 25 Major Drainage Channels

Status:

- No Further Action ROD signed by BCT in September 1997.

OU-3 - No Further Action Sites (12 sites)

Status:

- Sites 4, 6, 9, 10, 13, 15, 19, 20, 21, and 22 -- No Further Action ROD signed for in September 1997.
- Sites 7 and 14 -- No Further Action ROD signed in June 2001.

Page 5

MCAS EL TORO
INSTALLATION RESTORATION PROGRAM

OU-1/OU-2A - Sites 18 and 24 Groundwater

Status:

- Settlement Agreement signed by Navy, Regulatory Agencies, and Dept. of Justice. The agreement paves way for Irvine Desalter Project to proceed with Navy and Dept. of Justice support and financial assistance for cleanup of VOCs.

Next Steps:

- Issue Proposed Plan for final Regulatory agency/BRAC Cleanup Team (U.S. EPA, Cal-EPA DTSC, RWQCB) review (Oct 2001); subsequent issuance for public review and comment period (Oct 2001); public meeting to be held (Nov/Dec 2001).
- Issue Draft Record of Decision (ROD) for BCT review (Jan/Feb 2002).

Page 6

MCAS EL TORO
INSTALLATION RESTORATION PROGRAM

OU-2A - Site 24 Soil

Status:

- Cleanup of VOCs in vadose zone soils using soil vapor extraction system (SVE) began in March 1999.
- By the end of 1999, vapor concentrations of VOCs at all SVE wells were below soil cleanup goals.
- Testing to confirm that soil cleanup goals have been achieved was completed in March 2000.
- Site closure verification sampling completed in September 2000.
- Draft Vadose Zone Closure Report documenting that cleanup goals have been attained was submitted for BCT review in June 2001.

Page 8

MCAS EL TORO
INSTALLATION RESTORATION PROGRAM

OU-1/OU-2A - Sites 18 and 24 Groundwater (continued)

Next Steps: (continued)

- Complete Design of Irvine Desalter Project
- Construct Irvine Desalter Project
- Implement VOC removal from groundwater and treatment of extracted contamination

Page 7

MCAS EL TORO
INSTALLATION RESTORATION PROGRAM

OU-2A - Site 24 Soil (continued)

Next Steps:

- Issue Final Vadose Zone Closure Report
- Final Soil Cleanup ROD (without groundwater)

Page 9

MCAS EL TORO
INSTALLATION RESTORATION PROGRAM

OU-2B - Landfill Sites 2 and 17

Status:

- Interim ROD was finalized and signed by the BCT in July 2000.
- 30% Design Submittal for landfill cap system issued to BCT and other agencies in February 2001. Comments provided to the Navy.
- 60% Design underway (for Navy review)

Next Steps:

- Issue 90% Design for BCT and other agency review (April 2002)
- Issue Final Design
- Issue Final ROD for BCT concurrence
- Begin landfill cap system construction
- Complete landfill cap construction
- Conduct ongoing post-closure maintenance and monitoring.

Page 10

MCAS EL TORO
INSTALLATION RESTORATION PROGRAM

OU-3 - Remaining Sites - Sites 8, 11, and 12

Status:

- Site 11 ROD finalized in September 1999
- Sites 8, 11, and 12 -- Re-evaluation of human health risks nearing completion, along with completion of the Radiological Survey with Release Report for Sites 8 and 12

Page 12

MCAS EL TORO
RESTORATION ADVISORY BOARD

OU-2C - Landfill Sites 3 and 5

Status:

- Developing Draft Final ROD

Next Steps:

- Issue Draft Final ROD for BCT concurrence upon completion of Radiological Survey with Release Report
- Issue Final ROD
- Develop and issue 30% Design Submittal of landfill cap system to BCT and other agencies
- Develop and submit 60% Design for Navy review
- Develop and submit 90% Design for BCT review
- Complete Final Design
- Begin landfill cap system construction
- Complete landfill cap construction
- Conduct ongoing post-closure maintenance and monitoring

Page 11

MCAS EL TORO
INSTALLATION RESTORATION PROGRAM

OU-3 - Remaining Sites - Sites 8, 11, and 12 (continued)

Next Steps:

- Based on re-evaluation of risk, issue Tech Memo for BCT review (Due September 2001)
- Issue Draft ROD for Sites 8 and 12 for BCT review; issue Final ROD
- Issue Draft ROD Amendment for Site 11 for BCT review; issue Final ROD Amendment
- If cleanup is necessary, proceed with Remedial Design/Remedial Action activities

Page 13

MCAS EL TORO
INSTALLATION RESTORATION PROGRAM

OU-3 - Remaining Sites - Site 16

Status:

- Site 16 Draft Final Focused Feasibility Study undergoing BCT review.

Next Steps:

- Incorporate BCT comments and issue Final Feasibility Study
- Issue Proposed Plan for final regulatory agency/BRAC Cleanup Team (U.S. EPA, Cal-EPA DTSC, RWQCB) review
- Issue Proposed Plan for public review and comment
- Issue Draft ROD for BCT review (Nov 2001)
- Issue Final ROD that includes Responsiveness Summary that responds to public comments
- Regulatory agency concurrence with ROD
- Proceed with Remedial Design/Remedial Action

Page 14

MCAS EL TORO
INSTALLATION RESTORATION PROGRAM

OU-3 - Remaining Sites - Site 1

Status:

- Revise and prepare Draft Final Ordnance Explosives (OE) Work Plan for Navy and BCT review and Finalize Draft Final RI Work Plan

Next Steps:

- Incorporate comments and issue Draft Final OE Work Plan for 30-day public comment period (Oct 2001)
- Respond to public comments and finalize OE and RI Work Plans
- Proceed with RI and OE field work including Tier I and II & Tier III investigations, laboratory analysis, data evaluation, human health risk analysis and ecological risk assessment
- Develop Draft and Draft Final RI Reports for BCT review and issue Final RI Report

Page 15

MCAS EL TORO
INSTALLATION RESTORATION PROGRAM

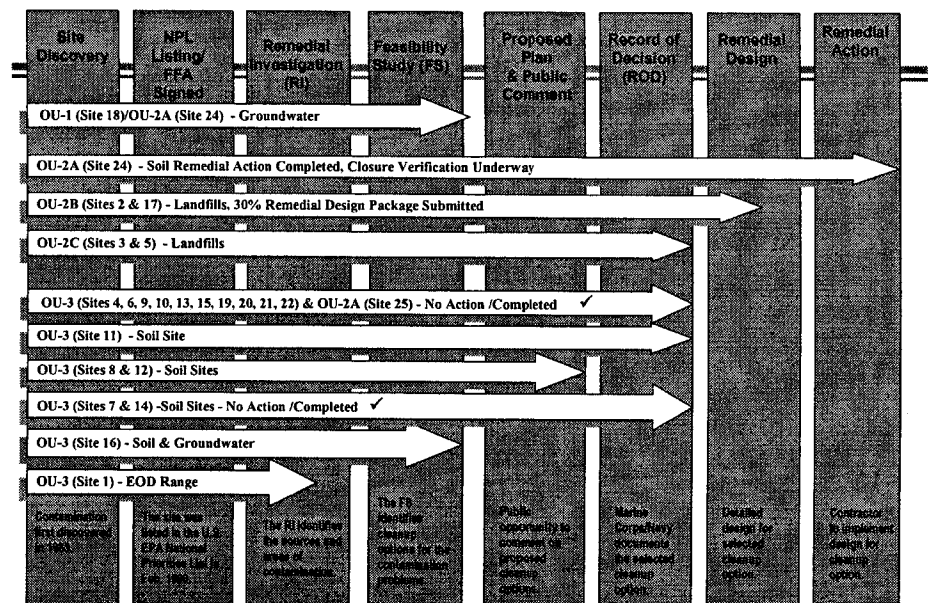
OU-3 - Remaining Sites - Site 1 (continued)

Next Steps:

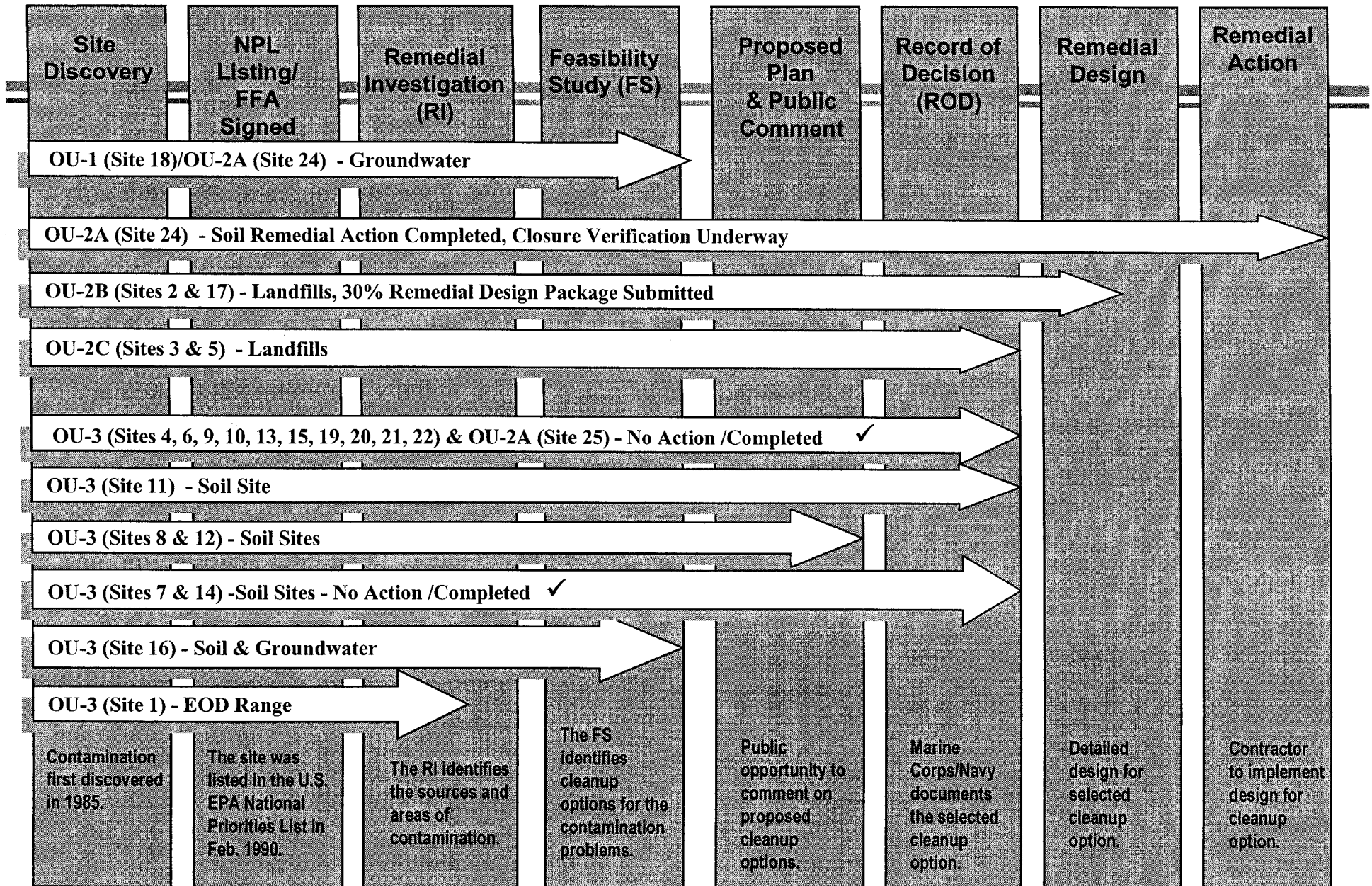
- Develop Draft and Draft Final Feasibility Study, including all necessary BCT reviews
- Issue Final Feasibility Study
- Issue Proposed Plan for final regulatory agency/BRAC Cleanup Team (U.S. EPA, Cal-EPA DTSC, RWQCB) review
- Issue Proposed Plan for public review and comment period; public meeting to be held
- Issue Draft ROD for BCT review
- Issue Final ROD that includes Responsiveness Summary that responds to public comments
- Regulatory agency concurrence with ROD
- Proceed with Remedial Design/Remedial Action

Page 16

Installation Restoration Program Process - MCAS El Toro
Status Update -- September 2001



Installation Restoration Program Process - MCAS El Toro **Status Update -- September 2001**



Compliance Program Update

Marine Corps Air Station, El Toro

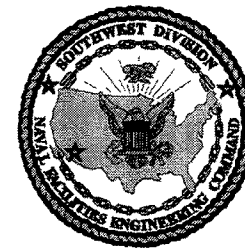
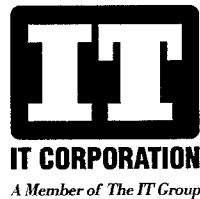
Restoration Advisory Board

Meeting

September 19, 2001

Presented by: Dhananjay Rawal

IT Corporation



Compliance Program Update

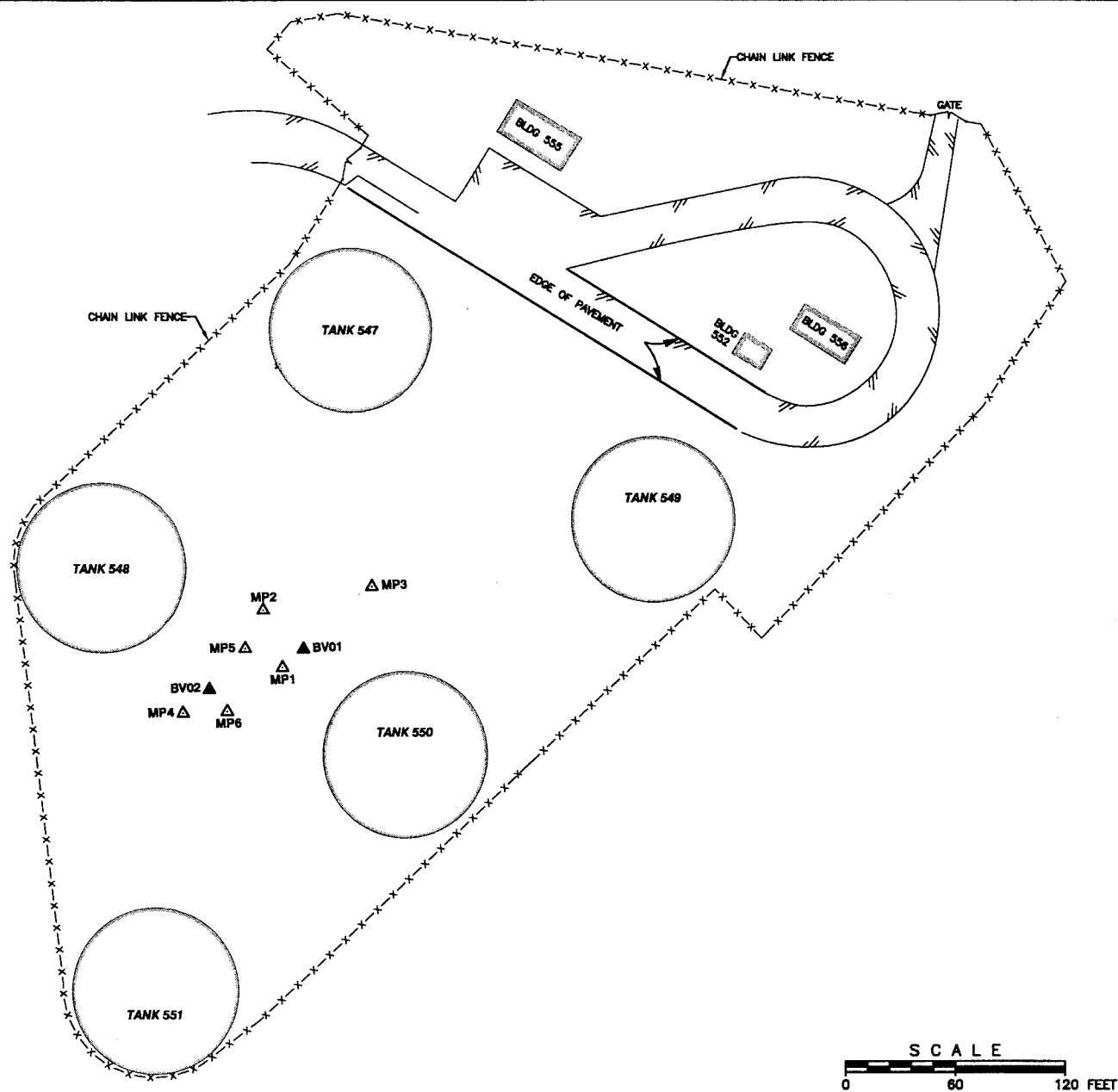
- Former Tank Farm 555 - Update
- Closure of On-Station Secondary JP-5 Pipeline Components

Tank Farm 555 Update

- Five 567,000 gallon capacity underground tanks
- Tank Farm 555 includes the inactive USTs 547, 548, 549, 550, and 551 which the Navy plans to close in place
- All USTs were taken out of service by December 1998. All the distribution piping within Tank Farm 555 was removed and sampled with OCHCA oversight in June 2000.
- A Pilot Bioventing test was conducted from 9/10/01 through 9/18/01.
- Soil air permeability test was conducted on the two bioventing wells at the site to determine the radius of influence of each injection well. Helium gas was used as a tracer.
- Pressure transducers were installed in 8 monitoring points to record the pressure changes at each point continuously.

Tank Farm 555 Update (Continued)

- The pressure data from transducers were recorded by a data-logger and will be down loaded to a computer for data analysis.
- The results from the permeability test will be used to determine the location of new bioventing wells for a full scale bioventing system.
- In-situ Respirometry (ISR) test was conducted, as a part of pilot test, for 120 hours on selected wells to determine oxygen consumption rate (by bacteria) at the site.
- Levels of oxygen, carbon dioxide, methane, and total volatile hydrocarbon were measured during this pilot test.
- Installation of additional Bioventing wells will commence in November 2001.

**LEGEND:**

- MP2 BIOVENTING PRESSURE MEASURING POINT
- BV01 BIOVENTING INJECTION WELL
- x-x- CHAIN LINK FENCE

REFERENCE:

JOB NO. 87102TF555 BY CALVADA SURVEYING, INC.
DATE OF SURVEY: 1/21/2000



EFA WEST
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CONTRACT NO. N62474-98-02076

FIGURE 2
TANK FARM 555
BIOVENTING WELL LOCATIONS

MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

JP-5 Fuel Supply Pipelines Background

- JP-5 Fuel Supply Pipeline System Consisted of Primary and Secondary Pipelines
 - Primary Pipelines Supplied Fuel from Tank to Tank (I.e. TF 555 to MAG 11)
 - Secondary Pipelines Supplied Fuel to Aircraft or Tank Trucks (I.e. Hot Fueling Systems at MAG 11 and Sharpshooters)
- The closure of the off-Station sections of the pipeline is being managed by the Defense Fuels Region West, while the closure of the on-Station pipeline is being managed by Southwest Division, Naval Facilities Engineering Command.

JP-5 Pipeline Update (Continued)

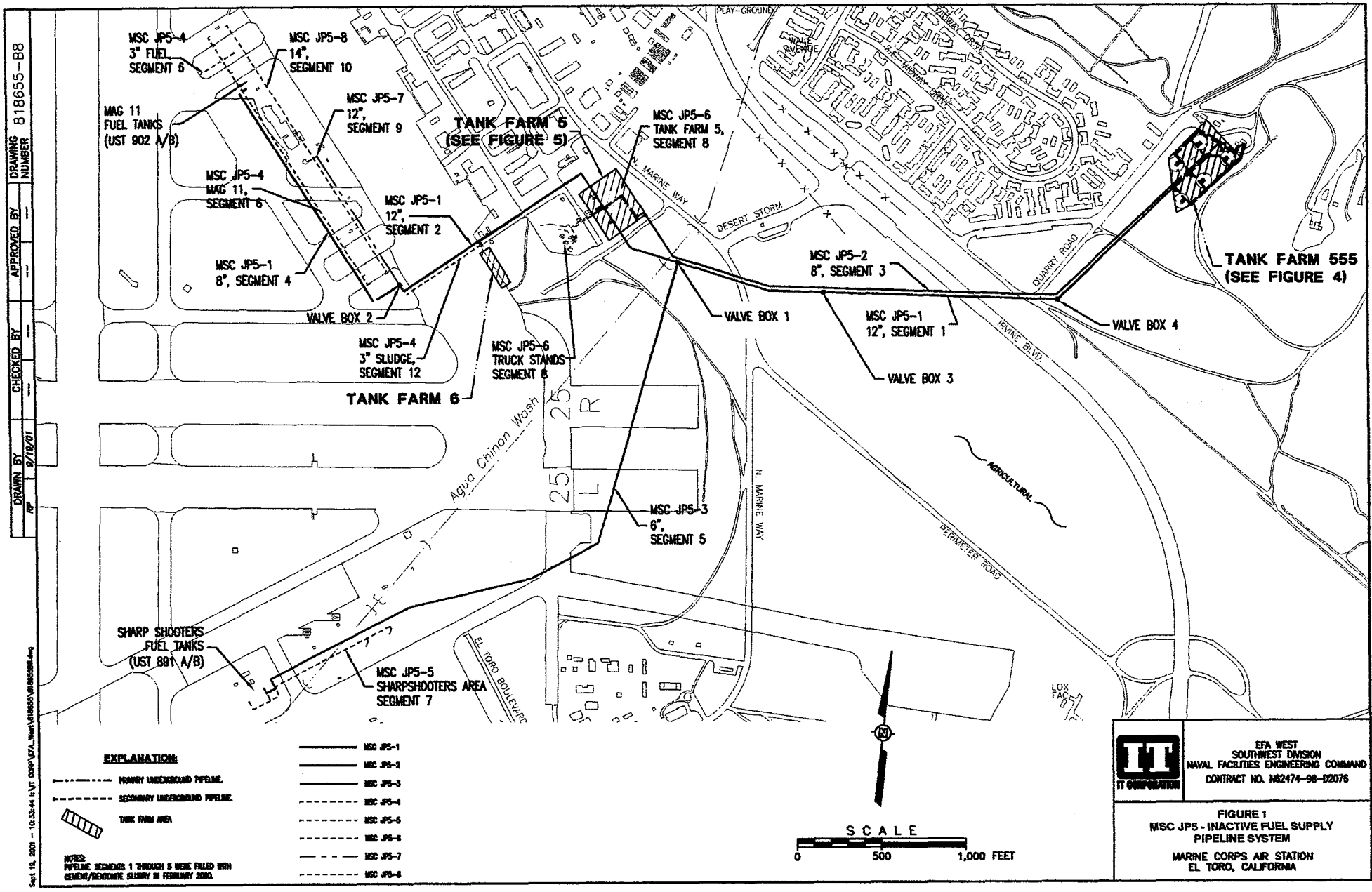
Primary Pipelines

- More than 6,000 feet of Primary JP-5 pipelines extended from Tank Farm 555 to former USTs 902A, 902B, and 902C and to former USTs 891A and 891B.
- Cleaning and tightness testing of the pipeline conducted in January 2000. Pipelines hydrostatically tested in accordance with State Fire Marshall requirements.
- All pipelines filled with cement grout in January 2000.

JP-5 Pipeline Update (Continued)

Secondary Pipelines

- More than 7,200 Feet of Fuel Distribution Pipelines
- Provided Fuel from Day Tanks (USTs at MAG 11, Tank Farm 5 and Sharpshooters) to Aircraft Fueling Stations or Tanker Truck Loading Stands
- Status:
 - Field Verification to Locate Lines - Completed August 2001
 - Removal of Remaining Fuel via Vacuum Trucks - September 2001
 - Cleaning, Pressure Testing using Nitrogen gas and Closure - October - December 2001



DRAWING NUMBER 818655-B8

APPROVED BY

CHECKED BY

DRAWN BY

DATE 9/19/01

Sept 19, 2001 - 10:33:44 H:\VT CORP\VTFA_Misc\VT8655-B8.dwg

ITT CORPORATION

EFA WEST
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CONTRACT NO. N62474-96-D2076

FIGURE 1
MSC JP5 - INACTIVE FUEL SUPPLY
PIPELINE SYSTEM
MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

Status of Radiological Surveys

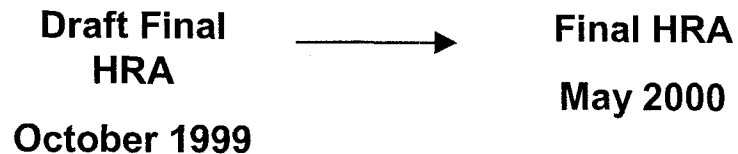
Presentation for the MCAS El Toro Restoration Advisory Board (RAB)

Wednesday, September 19, 2001

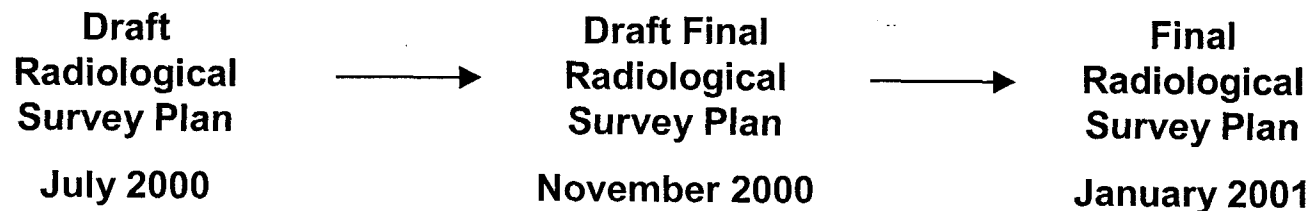
**Presented by Roy F. Weston, Inc.
Mare Island Office
Vallejo, CA**

Radiological Status

Historical Radiological Assessment (HRA):



Radiological Survey Plan :

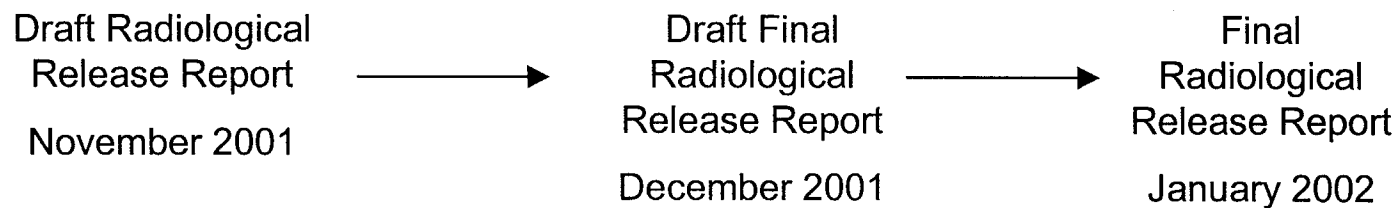


Radiological Status

Perform On-Site Radiological Surveys:



Radiological Release Report*:



***Dates assume no radiological remediation.**

Radiation Survey Status

Sites to be Radiologically Surveyed

1. Original Landfill (IR Site 3)
2. Perimeter Road Landfill (IR Site 5 and APHO-46)
3. DRMO Yard 1 (IR Site 8)
4. DRMO Yard 3 (AOC 264)
5. NBC Complex (APHO-38, Bldgs 787, 1789 and 1803)
6. Suspected Site of former Radium Plaque Adaptometer Bldg.
7. Former Site of Industrial Waste Treatment Plant (IR Site 12), including Bee Canyon Wash (IR Site 25 - partial)
8. Anomaly Area 3
9. Hangar 295
10. Command Museum, Bldgs 242 (including aircraft parts yard), 243 and 244
11. Magazine Road Landfill (IR Site 2)
12. Explosive Ordnance Disposal Range (IR Site 1)
13. Communications Station Landfill (IR Site 17 and APHO-44)
14. DRMO Bldgs 319 and 360 [if required]

Radiation Survey Status

Radiological Surveys Completed –

Surveys of the following areas and buildings are complete:

- IR Site 3 (Original Landfill)
- IR Site 5 (Perimeter Road Landfill), including APHO-46
- DRMO Yards 1 (IR Site 8) and 3 (AOC-264)
- Suspected Former Site of the Radium Plaque Adaptometer Bldg
- NBC buildings (787, 1789, 1803) and NBC outdoor areas, including APHO-38
- IR Site 12 and Bee Canyon Wash, IR Site 25 (partial)
- Anomaly Area 3
- Hangar 295
- Command Museum buildings (242, 243, 244) and outdoor parts storage area
- IR Site 2 (Magazine Road Landfill)

Radiation Survey Status

Radiological Surveys and Sampling Remaining:

Surveys-

- EOD Range – In progress; will complete September 21, 2001.
- Communications Station Landfill (IR Site 17), including APHO-17 will commence survey September 24 and complete October 13, 2001.
- DRMO buildings 319/360 will be surveyed October 15-18, if required.

Sampling-

- IR Site 3 (Original Landfill) – 20 samples
- IR Site 5 (Perimeter Road Landfill) – 5 samples
- DRMO Yard 1 - 22 samples
- IR Site 12 (Industrial Waste Treatment Plant) – 15 samples
- Anomaly Area 3 – 1 sample
- Aircraft Parts Yard – 4 samples
- NBC Complex – 17 samples
- IR Site 2 (Magazine Road Landfill) – approximately 30 samples
- IR Site 17 (Communications Station Landfill) – It is estimated that 20 to 25 Samples may be required after surveys are complete (based on IR Site 2)

Radiation Survey Results

Former Industrial Waste Treatment Plant (IR Site 12) and Bee Canyon Wash (IR Site 25 – Partial)

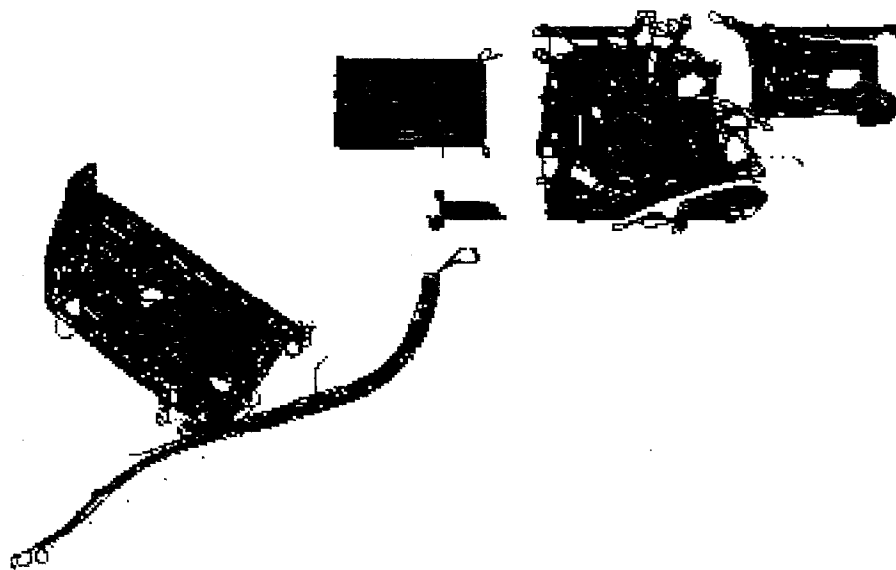
Approximate area of site – 4 acres

Approximate area Surveyed – 4.75 acres

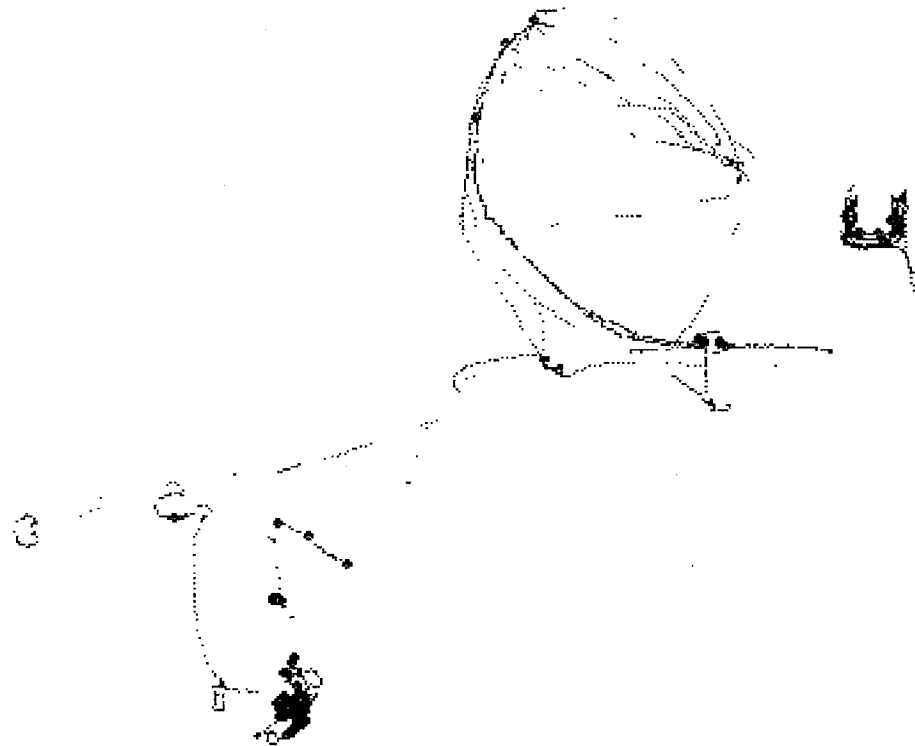
15 potential anomalies were found during the collection of more than 450,000 high-density survey data points.

15 samples are required to be taken from the above areas to be analyzed for isotope(s) present.

IR Site 12 - Tractor Surveys



IR Site 12 - Manual Surveys



Radiation Survey Results

Anomaly Area 3 –

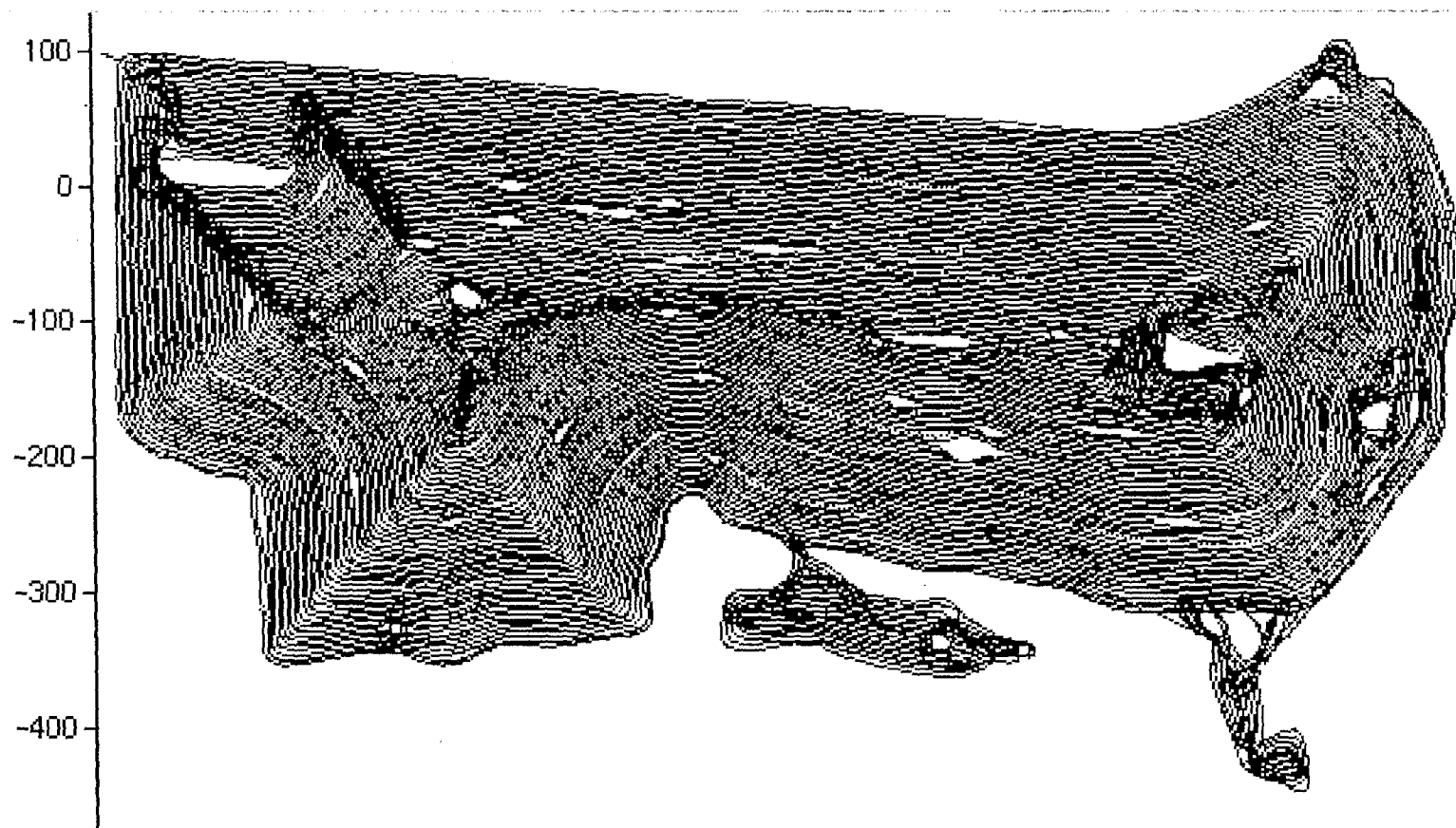
Approximate area of site – 7 acres

Approximate area Surveyed – 9.5 acres

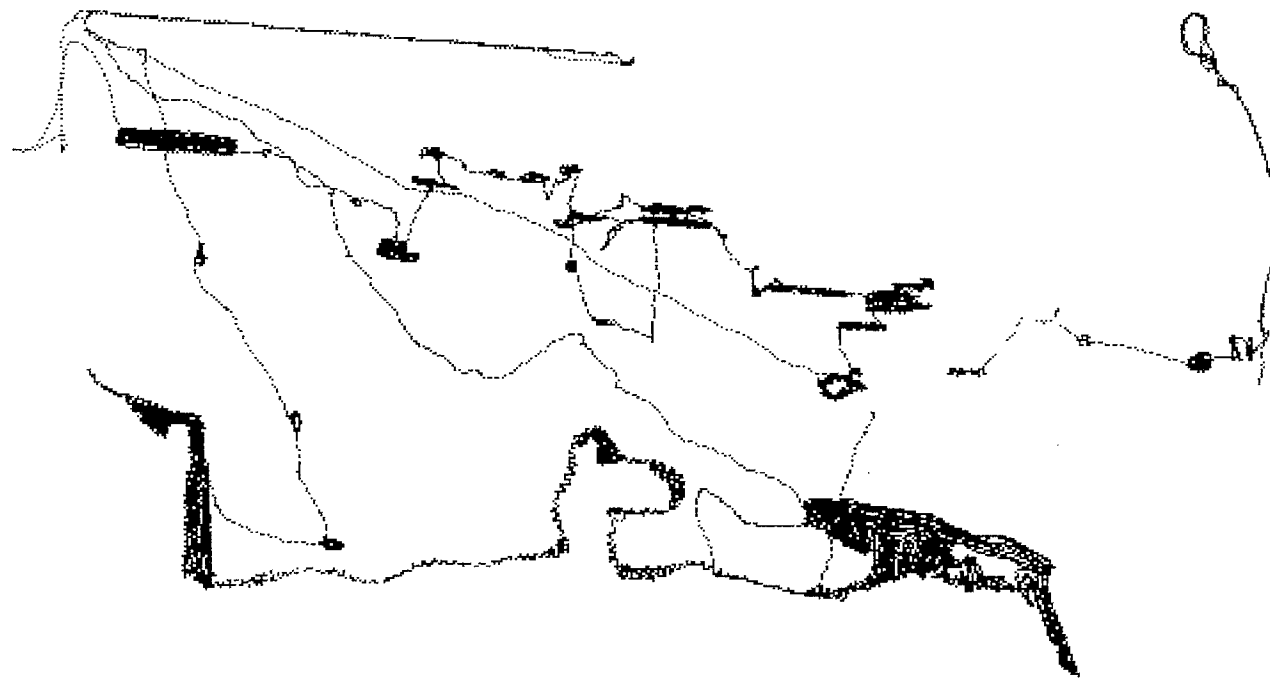
One potential anomaly was found during the collection of more than 625,000 high-density survey data points at this site.

One sample is required to be taken from Anomaly Area 3 to be analyzed for isotope(s) present.

Anomaly Area 3 - Tractor Surveys



Anomaly Area 3 - Manual Surveys



Radiation Survey Results

NBC Complex – Outdoor Surveys

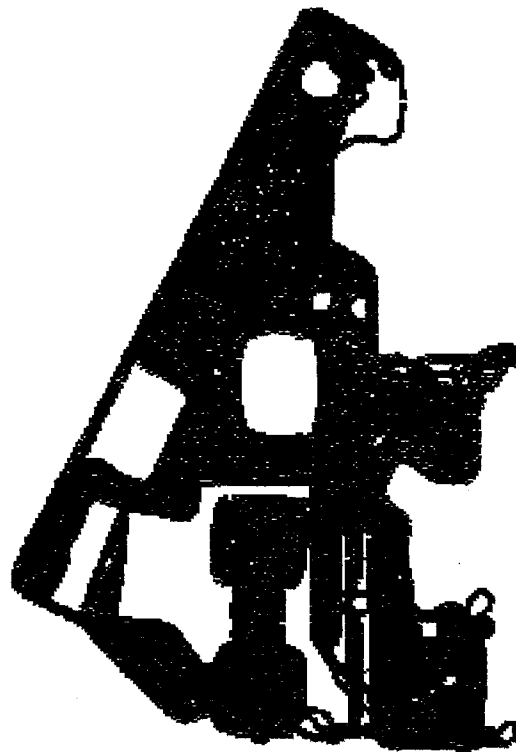
Approximate area of site – 2.5 acres

Approximate area surveyed – 2.5 acres

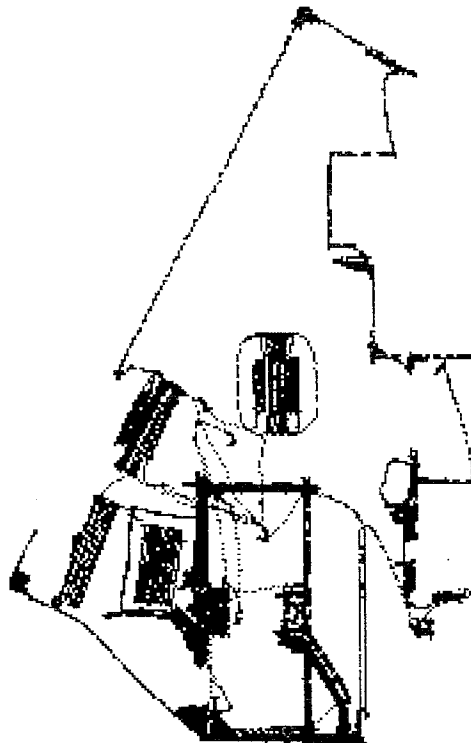
17 potential anomalies were found during collection of more than 250,000 high-density survey data points.

17 samples will be taken from the NBC Complex to be analyzed for isotope(s) present.

NBC Area - Tractor Surveys



NBC Area - Manual Surveys



Radiation Survey Results

Aircraft Parts Yard (adjacent to building 242)

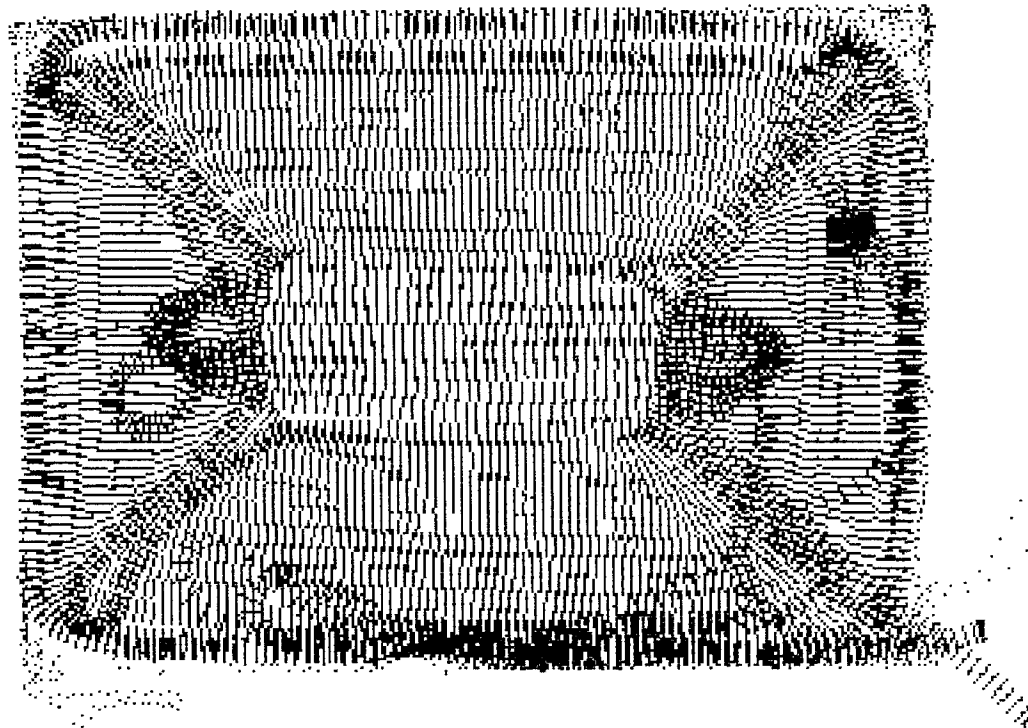
Approximate area of site – 0.3 acres

Approximate area surveyed – 0.4 acres

Four potential anomalies were found during the collection of more than 37,000 high-density survey data points.

Four samples will be collected at the potential anomaly areas and analyzed for isotopes present.

Aircraft Parts Yard – Tractor Surveys



Radiation Survey Results

Magazine Road Landfill (IR Site 2) –

Approximate area of Site - 27 acres

Approximately area surveyed - 25 acres (remainder of landfill was not accessible for survey, due to endangered species habitat, rip-rap covering and/or steep terrain).

The survey data is still being analyzed, however, no specific anomalies have been identified during the evaluation of more than a million high-density survey data points. The site did contain areas (similar to IR Site 3) where the general surface of the landfill reads slightly higher than the investigation levels.

Approximately 30 samples will be collected at locations reading higher than the investigation levels and analyzed for isotope(s) present.

Radiation Surveys

Next Steps at MCAS El Toro:

1. Complete the radiological characterization surveys and sampling as indicated above.
2. Based on the results of the characterization surveys, determine whether any areas require remediation.
3. If remediation is required, prepare Radiological Work Plan to perform the necessary clean-up.
4. If remediation is not required, issue Radiological Release Report.

**MCAS EL TORO
RAB MEETING**

**Aquifer Test
IRP Site 2
SEPTEMBER 19, 2001**

Presented By
Crispin Wanyoike
Earth Tech, Inc.

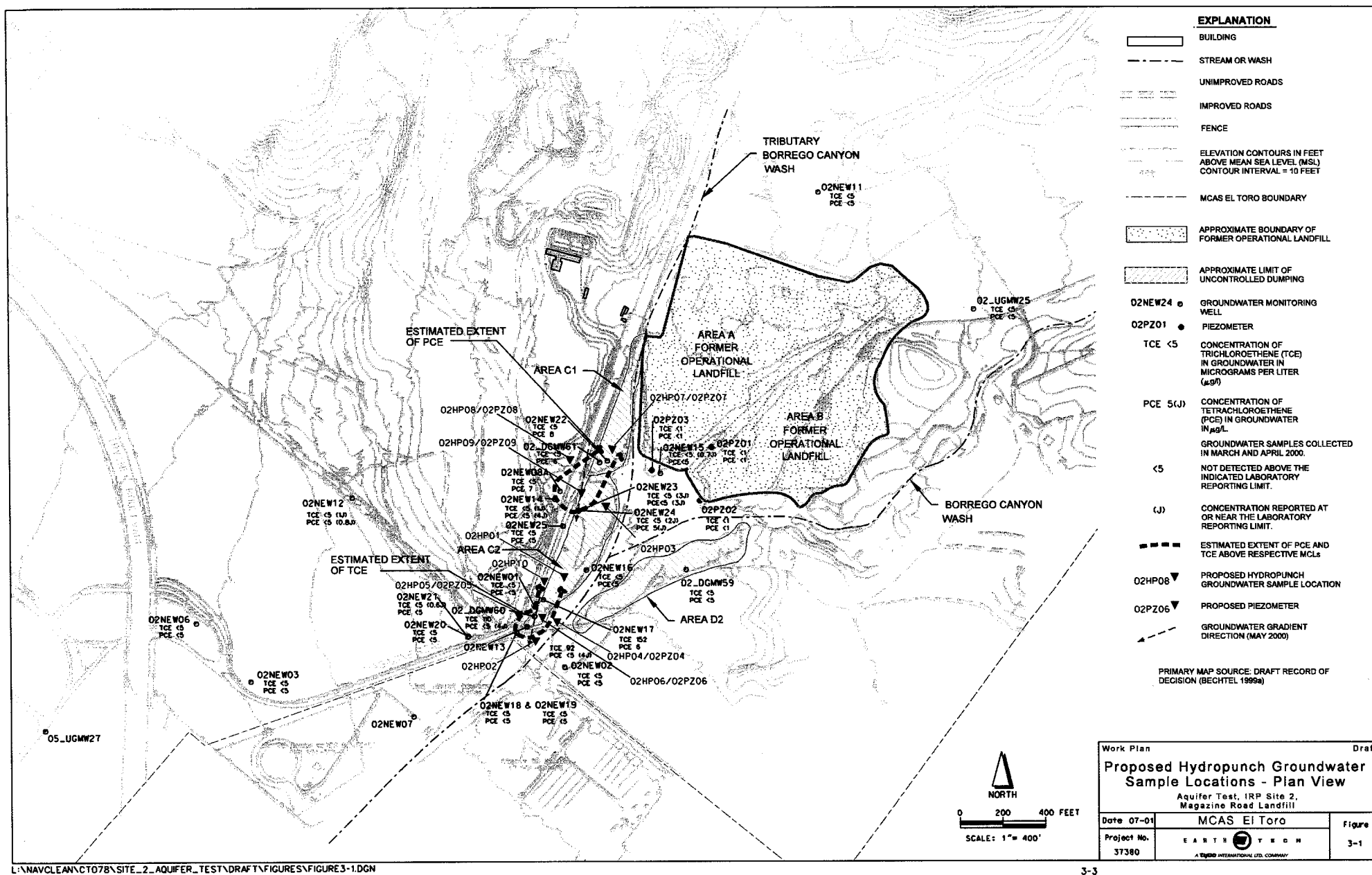
**Aquifer Test
IRP Site 2**

• BACKGROUND

- Located between tributaries of the Borrego Canyon Wash.
- Approximately 27 acres.
- Used as the Station landfill from the 1950s to 1980.

• PREVIOUS INVESTIGATIONS

- Remedial Investigation (1997).
- Feasibility Study (1997).
- Record of Decision (1999).
- Radionuclide Evaluation (2001).



Aquifer Test IRP Site 2

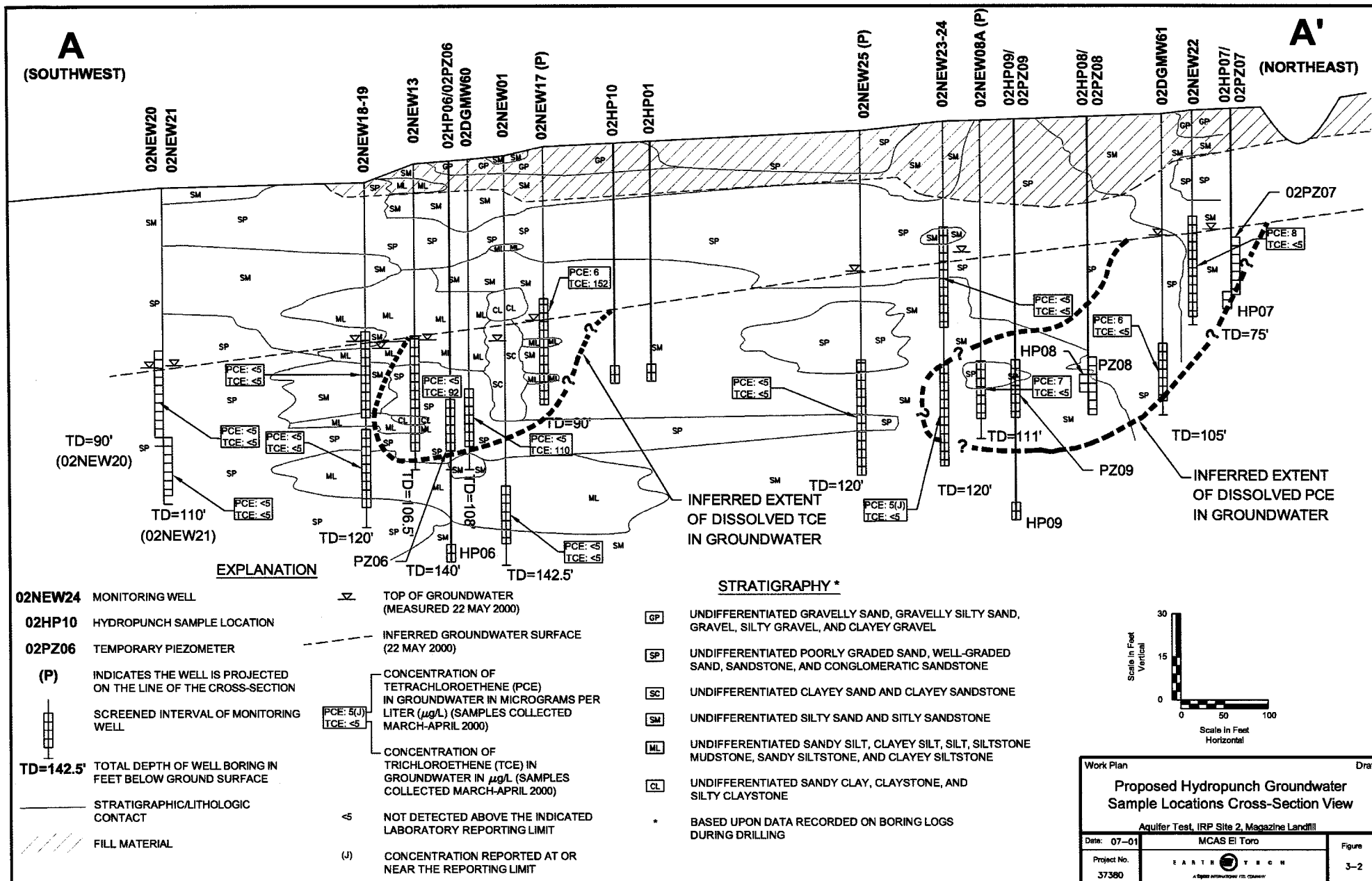
• EXTENT OF GROUNDWATER IMPACT

- The lateral extent of the tetrachloroethene (PCE) plume in the cross-gradient and downgradient directions has not yet been fully defined.
- The highest reported concentration of PCE was 8 µg/L (based upon data collected in March and April 2000).
- The lateral extent of the trichloroethene (TCE) plume toward the southeast and north/northeast has not yet been fully defined.
- The highest reported concentration of TCE was 152 µg/L (based upon data collected in March and April 2000).
- Hydropunch groundwater samples will be collected for laboratory analysis of VOCs to evaluate the lateral extent of VOC impact.

Aquifer Test IRP Site 2

• OBJECTIVES

- Evaluate the extent of groundwater impacted with volatile organic compounds.
- Evaluate aquifer properties.
- Evaluate mass-removal rates.
- Evaluate the potential for natural attenuation of VOCs.
- Data collected during this test will ultimately be used to select and design the most appropriate response strategy for the VOC plumes.



Aquifer Test IRP Site 2

- **FIELD WORK**

- Existing groundwater monitoring wells will be sampled.
- DO and ORP will be measured in eight existing wells for evaluation of the potential for natural attenuation of VOCs.
- Hydropunch groundwater samples will be collected at ten locations.
- Piezometers will be installed at six of the ten Hydropunch locations.
- During the aquifer test, groundwater will be extracted from six pumping wells consecutively, and drawdown will be measured in nearby wells and piezometers (between four and ten observations wells will be used for each pumping well).

Aquifer Test IRP Site 2

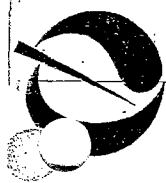
- **DATA COLLECTED DURING THE AQUIFER TEST WILL ALLOW DETERMINATION OF THE FOLLOWING:**

- Aquifer Properties (Transmissivity, Hydraulic Conductivity).
- Capture Zones.
- Mass-Removal Rates.

Aquifer Test IRP Site 2

- **SCHEDULE**

- Draft Work Plan - Issued August 2001.
- BCT Review - September 2001.
- Final Work Plan - November 2001.
- Field Work - November 2001 to May 2002.
- Draft Technical Memorandum - August 2002.



Department of Toxic Substances Control



Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Edwin F. Lowry, Director
5796 Corporate Avenue
Cypress, California 90630

Gray Davis
Governor

August 13, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Marine Corps Air Station El Toro
Base Realignment and Closure
P.O. Box 51718
Irvine, California 92619-1718

DRAFT TECHNICAL MEMORANDUM, PHASE II EVALUATION OF RADIONUCLIDES IN
GROUNDWATER AT FORMER LANDFILL SITES AND THE EXPLOSIVE ORDNANCE
DISPOSAL (EOD) RANGE, MARINE CORPS AIR STATION (MCAS) EL TORO

Dear Mr. Gould:

The Department of Toxic Substances Control (DTSC) reviewed the above-referenced document, dated July 2001. This technical memorandum presents the results of a more definitive evaluation conducted at the former landfill sites (Installation Restoration Programs (IRP) Sites 2, 3, 5 and 17) and the EOD range (IRP Site 1). The objective of the evaluation was to verify conclusions from previous investigations regarding radionuclides in groundwater.

DTSC has no comments on the document. DTSC also forwarded the document to the California Department of Health Services (DHS) for review. DHS comments are enclosed. These comments were forwarded by DHS directly to the Department of the Navy on July 27, 2001.

Please contact me at (714) 484-5395 if you have any questions.

Sincerely,

Triss M. Chesney, P.E.
Remedial Project Manager

Enclosure

cc: See next page

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption.
For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at www.dtsc.ca.gov.*

Memorandum

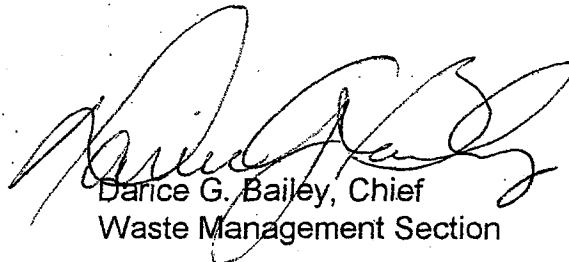
Date: July 27, 2001

To: Ms. Triss Chesney
Department of Toxic Substances Control (DTSC), Region 4
Office of Military Facilities
5796 Corporate Avenue
Cypress, California 90630

From: Environmental Management Branch
P.O. Box 942732
601 North 7th Street, MS 396
Sacramento, California 94234-7320
(916) 445-0498

Subject: Review of the *Draft Technical Memorandum, Phase II Evaluation of Radionuclides in Groundwater at Former Landfill Sites and the EOD Range, Marine Corps Air Station (MCAS) El Toro, California, July 2001.*

Attached are The Department of Health Services' (DHS) comments on the subject report. This review was performed by Mr. Kurt Jackson and Ms. Deirdre Dement, Associate Health Physicists, in support of the Interagency Agreement between DTSC and DHS. If you have any questions concerning this review, or if you need additional information, please contact Ms. Dement at (916) 324-1378.



Darice G. Bailey, Chief
Waste Management Section

cc: Mr. Dean Gould
BRAC Environmental Coordinator
U.S. Marine Corps Air Station - El Toro
P. O. Box 51718
Irvine, California 92619-1718

Ms. Deirdre Dement
PO Box 942732
601 North 7th Street, MS 396
Sacramento, CA 95814

Department of Health Services

Review of Draft Technical Memorandum, Phase II Evaluation of Radionuclides in Groundwater at Former Landfill Sites and the EOD Range, Marine Corps Air Station, El Toro, California

July 27, 2001

DTSC Resource Planning Form # 579

The following comments are in response to the request from Ms. Triss Chesney of the Department of Toxic Substances Control to review the *Draft Technical Memorandum, Phase II Evaluation of Radionuclides in Groundwater at Former Landfill Sites and the EOD Range, Marine Corps Air Station (MCAS) El Toro*, dated July 2001. This document was reviewed by Mr. Kurt Jackson and Ms. Deirdre Dement of DHS.

General Comments:

1. The subject document is well written and includes appropriate information. Based on this report DHS concurs that the uranium found in the groundwater at this time is naturally occurring.

Specific Comments:

1. Executive summary, Page i, recommends reevaluation of CERCLA Groundwater Monitoring Plan with respect to the need for radionuclide monitoring. The conclusions on Page 5-1 also suggest possible revision of the record-of-decision based on this study. It should be noted that the current lack of radionuclide contamination in groundwater does not speak to the radiological content of landfills, which has not yet reached the groundwater. Therefore the need or lack of need for radionuclide groundwater monitoring in the future will depend on the knowledge of what went into the landfills and what was used at the site more than it will depend on the results of this study.
2. Page 1-7, Lines 1 and 2, should read Environmental Management Branch instead of Radiological Services Branch.
3. Page 2-4 first paragraph under General Chemistry does not mention whether stable isotope samples were filtered. However, on Page 3-1 it is stated that the stable isotope samples were unfiltered, but this seems to be contradicted by the sentence above that, which indicates that the samples collected for uranium analysis (which were filtered) were also measured for stable isotopes. Clarification of these statements is needed. The basis for selecting filtered or unfiltered samples for stable isotope analysis should also be stated on Page 2-4.
4. The footnotes on Table 3-2, Page 3-5 should specify the conversion between tritium units (TU) and pCi per liter. Tritium Units are not a unit familiar to most individuals

who may be reviewing the document and drinking water standards are stated in units of pCi per liter. The conversion factor is given on Page vii under the acronyms and abbreviations section.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

August 14, 2001

BRAC Environmental Coordinator
Base Realignment and Closure, Environmental Division
Attn: Mr. Dean Gould
P.O. Box 51718
Irvine, CA 92619-1718

RE: Draft Technical Memorandum Phase II Evaluation of Radionuclides in Groundwater at the Former Landfill Sites and EOD Range, Marine Corps Air Station, El Toro, dated July, 2001

Dear Mr. Gould:

EPA has reviewed the above-referenced document and provides the following comments from Steve Dean, EPA's technical expert in radiological issues:

Table 3-2: Groundwater Analytical Results on Page 3-5:

Uranium 238 : Uranium 235 ratios Columns: The table needs to include the actual concentrations of U238 and U235 for each sample as well as the ratios of each radionuclide in each sample. Documenting the range of naturally occurring uranium concentrations in MCAS-ET groundwater is important reference data for future groundwater investigations.

Tritium Results Column: Both state and federal environmental regulations express the Maximum Contaminant Level (MCL) for tritium concentrations in water in picoCuries per liter (pCi/l) not tritium units (TUs). Since the purpose of this document is to report the information necessary for the reader to clearly understand whether or not groundwater in the study areas are impacted by radioactive contaminants, I recommend that the tritium data be reported in pCi/l. The tritium data in Table 3-2 should be reported in units that are consistent with regulatory MCLs for the sake of clarity and consistency.

Data Evaluation, Page 4-1

Item 8: The Navy has determined and then reported on the age of the water using tritium based on TU data, but should also include that the groundwater tritium levels are orders of magnitude below the drinking water MCL of 20,000 pCi/l.

received
8/21/01

If you have any questions, please call me at (415) 744-2366.

Sincerely,

A handwritten signature in cursive script, reading "Nicole G. Moutoux".

Nicole G. Moutoux
Project Manager
Federal Facilities Cleanup Branch

cc: Lynn Hornecker, SWDIV
Triss Chesney, DTSC
Patricia Hannon, RWQCB
Greg Hurley, RAB Community Co-Chair



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

August 14, 2001

BRAC Environmental Coordinator
Base Realignment and Closure, Environmental Division
Attn: Mr. Dean Gould
P.O. Box 51718
Irvine, CA 92619-1718

RE: Draft Site Closure Report, Vadose Zone Remediation, IRP Site 24, Marine Corps Air Station, El Toro, dated August, 2001

Dear Mr. Gould:

EPA has reviewed the above-referenced document in which the Navy describes remediation activities at Site 24 and subsequently recommends closure of the vadose zone at the site. In general we find the report to be thorough and well-written, however we have enclosed comments requesting clarification on several issues.

EPA's major concern is the time lag between the cessation of the SVE system and startup of the groundwater treatment system. We look forward to the Navy's evaluation of operating both the SVE system and groundwater system together before decommissioning the SVE system. We request that the Navy initiate working meetings to discuss the contents of such an evaluation.

If you have any questions, please call me at (415) 744-2366.

Sincerely,

A handwritten signature in cursive script that reads "Nicole G. Moutoux".

Nicole G. Moutoux
Project Manager
Federal Facilities Cleanup Branch

cc: Lynn Hornecker, SWDIV
Triss Chesney, DTSC
Patricia Hannon, RWQCB
Greg Hurley, RAB Community Co-Chair
Marcia Rudolph, RAB Subcommittee Chair

received
8/21/01

**Review of the Draft Site Closure Report, Vadose Zone Remediation
IRP Site 24, Volatile Organic Compounds Source Area
Marine Corps Air Station, El Toro, California**

GENERAL COMMENTS

1. As mentioned in our cover letter, EPA has some reservations about closing out the vadose zone at Site 24 without an operational groundwater system in place; particularly in light of the Navy's observation on page 3-3 of the report that levels of TCE in the groundwater remain above levels at which off-gassing could result in soil gas TCE concentrations above 27 micrograms/l. We suggest that the BCT have working meetings to discuss the contents of the proposed Navy evaluation of the benefits of operating the SVE system in tandem with the groundwater system.
2. The Introduction states that remediation was implemented in accordance with the Draft Final Interim Record of Decision (ROD) for Operable Unit (OU) 2A. The Report also states that the groundwater remedy for Site 24 is not addressed by this remedial effort, and will be addressed in the final ROD for Sites 18/24. It is unclear whether both soil and groundwater for Site 24 will be addressed in the ROD for sites 18/24 as well as why the ROD for Site 24 was interim. Please provide more information on the history of Site 24 and how it fits into the upcoming ROD for sites 18/24.
3. Since the Navy intends to use this document to close out Site 24 vadose zone, it should be a stand-alone document which does not require that the reader refer to too many other reports in order to have a complete understanding of why closure is warranted. Specific comments below address this concern as well.

SPECIFIC COMMENTS

1. **Section 1.1, Page 1-1:** The second paragraph states that past site activities have contributed to the VOCs found in the soil and groundwater, but these activities are not described. Please provide a brief description of the site activities which contributed to the contamination.
2. **Figure 1-4, Page 1-11:** The flow chart refers to Figure 1-6 for closure verification sampling; however, Figure 1-6 does not address closure verification sampling. Please revise the Report to include closure verification sampling in the flow chart in Figure 1-6 or revise the reference on Figure 1-4.
3. **Section 1-6, Page 1-15:** The Report indicates that the effective radius of influence (EROI) of each well was to be calculated during Phase I in order to determine if additional extraction wells were required to complete coverage gaps. The Report states that EROI coverage and plume boundaries were presented in the November monthly Progress Report; however, the results are not included in the Report. Please revise the Report to describe the results of the evaluation of EROI coverage and/or show the results

on a figure, and explain how the locations of the 14 additional extraction wells were selected.

4. **Section 1-6, page 1-15:** The Report refers to Figure 1-6 for a summary of the closure strategy; however, Figure 1-6 does not include the system-wide shutdown and closure sampling in the flowchart. Please revise Figure 1-6 to include all elements of the closure strategy.
5. **Section 2.2, Page 2-1:** The Report states that samples were collected from each active well where baseline concentrations were above the soil cleanup threshold; however, the Report does not state which wells were sampled. Please revise the Report to list the wells which were sampled.
6. **Section 2.3, Page 2-2:** This section describes sampling of the Central Treatment System (CTS); however, the CTS is not described. Please revise the Report to include a general description of the CTS.
7. **Section 2.3, Page 2-2:** The Report discusses sampling of the CTS; however, sampling and analysis procedures are not described. Please revise the Report to describe sampling and analysis procedures or provide a reference for this information.
8. **Section 2.3, Page 2-2:** This section provides the reasons for scheduled shutdowns of the CTS, but the durations of the shutdowns are not provided. Please revise the Report to indicate the duration of each shutdown.
9. **Section 2.3, Page 2-2:** The report lists TCE, PCE, Freon, and 1,1-DCE as the principle contaminants for evaluation of the operation of the CTS. Since carbon tetrachloride was listed in the ROD as a contaminant of concern (Table 1-1 of this Report), it appears that it should be included in the list of principle contaminants. Please revise the Report to clarify the omission of carbon tetrachloride from the contaminants used to evaluate the CTS.
10. **Figure 2-4, Page 2-9:** In order to better interpret the influent soil vapor concentrations shown on this figure, please revise the figure to indicate when the system was shut down.
11. **Table 2-1, Page 2-13:** This table indicates that pilot scale testing was conducted from 4/95 to 5/98 and portable SVE units were operated from 6/98 to 12/98; however, these activities are not described in the Report. For completeness, please revise the report to include descriptions of all previous removal actions or investigations at Site 24, including the above-listed activities.
12. **Section 3.1.1, page 3-1:** The Report describes the depth interval designations for SVE well design; however, it is not clear how the depth intervals were selected. For clarity Please revise the Report to explain the criteria used for selected SVE depth intervals.
13. **Section 3.1.2, Page 3-2:** The second paragraph on this page uses the acronyms EROI and

ROI and refers to Table 3-1 for a summary of the calculated ROI and EROI for each well. However, the distinction between EROI and ROI is not clear and ROI values are not included in the Table. Please revise the Report to clarify the definition of the ROI as opposed to the EROI and include ROI values in Table 3-1 or delete references to ROI from this Section.

14. **Section 3.2, Page 3-4:** This section indicates that the system-wide shutdown lasted 7 months; however, it is not clear how this shutdown duration was selected. Please revise the Report to indicate how a 7 month shut-down period was selected.
15. **Section 3.2, page 3-4:** The Report refers to Table 3-3 for closure sampling analytical results for TCE and PCE; however, PCE results are not included in the table. Please revise the Report to include PCE closure sampling results in Table 3-3.
16. **Section 3.2, Page 3-4:** The Report states that target analyte baseline samples exceeded their respective soil gas threshold concentrations in 23 of 79 wells; however, according to the information presented in Section 2.1 of the Report, only 37 wells were installed. If all of the multiple completions are counted, the total is 70. Please revise the Report to clarify the total number of wells (or completions) installed and clarify whether the 23 wells included in the closure sampling are wells or individual completions.
17. **Section 3.2, Page 3-4:** The Report states that closure sampling results demonstrate that TCE and PCE concentrations had been reduced to below the threshold concentrations established in the ROD; however, the Report does not indicate whether the other contaminants of concern (carbon tetrachloride, 1,1-DCE, and Freon 113) were below the threshold concentrations. It is also not clear whether PCE and TCE were the only analytes included in the closure sampling analysis. Please revise the Report to clarify which analytes were included in the closure sampling analysis. If carbon tetrachloride, 1,1-DCE and Freon 113 were not included, please revise the Report to clarify how it was demonstrated that all contaminants of concern identified in the ROD are below threshold concentrations.
18. **Section 4.1, Page 4-1:** The Report states that the initial shutdown was after three consecutive samples were below threshold concentrations at each well; however, the Report does not discuss the collection of three consecutive samples below threshold concentrations at each well. Please revise the Report to describe the dates these samples were collected at each well and clearly indicate where the results are presented in the Report.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

August 16, 2001

BRAC Environmental Coordinator
Base Realignment and Closure, Environmental Division
Attn: Mr. Dean Gould
P.O. Box 51718
Irvine, CA 92619-1718

RE: USEPA comments on draft Proposed Plan for Site 16, Marine Corps Air Station, El Toro,
dated June, 2001

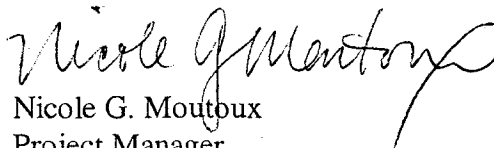
Dear Mr. Gould:

EPA has reviewed the above-referenced document and provides the enclosed comments. In general we find the format and content of the Proposed Plan acceptable. The enclosed comments are provided in order to clarify issues raised in the Plan. Please note that comments from EPA's legal staff will be forthcoming as soon as available.

Please also note that, although we do not address it in these comments, EPA has concerns with the No Further Action remedy proposed for vadose zone soils, as we will indicate in our comments to the draft final Focussed Feasibility Study for Site 16.

If you have any questions, please call me at (415) 744-2366.

Sincerely,


Nicole G. Moutoux
Project Manager
Federal Facilities Cleanup Branch

cc: Marc Smits, SWDIV
Triss Chesney, DTSC
Patricia Hannon, RWQCB
Greg Hurley, RAB Community Co-Chair
Marcia Rudolph, RAB Subcommittee Chair

received
8/24/01

**Comments on draft Proposed Plan for Site 16
Marine Corps Air Station, El Toro
June, 2001**

General Comment

EPA has concerns with the feasibility of the Navy's preferred remedy because it allows contamination in the groundwater to migrate beyond its current footprint and therefore may not comply with groundwater ARARs. In fact, the remedy does not seem to meet one of the Navy's remedial action objectives stated on page 8 of the proposed plan. The Navy's second RAO is to "Prevent further migration of VOC-contaminated groundwater from the source area". By not providing containment of the plume, it is difficult to determine how the Navy is meeting this objective.

Specific Comments

1. Pg 1, second paragraph in right column: The Navy makes the following statement, "In general, the risks to human health for exposure to soil at the site are considered within U.S. EPA's allowable or generally allowable risk range under residential and industrial reuse scenarios." The term "in general" implies that some surface soil areas fall out of these categories. If so, they would require action. Please rephrase this sentence.
2. Pg 1, last sentence: This sentence ends with "by the..." and does not finish up on then next page.
3. Pg 2, 1st paragraph of second column: Second sentence has a typo, "provides " should be "provide".
4. Pg 2, Last paragraph under Units 1 and 2: In this paragraph, the Navy makes reference to the petroleum contamination which exists at the site and that it will be addressed at a later date. Since these contaminants are commingled, please provide a justification of why it makes sense to handle this contamination separately and not simultaneously with the VOC clean up of soils and groundwater.
5. Pg 7, Table 3: In describing risk management considerations for Unit 3, please include the percentage of risk contributed by each chemical. For example, how much of the risk is due to PAHs
6. Pg 9, Figure: The legend on the figure refers to a "containment plume". Should this say "contaminant plume"? If not, what is a containment plume?
7. Pg 10, Compliance with ARARs: As noted in the general comment above, given that

alternative 2 allows migration of the contaminated groundwater above MCLs, EPA is unsure that groundwater ARARs have been satisfied.

8. Pg 15, second bullet: The Navy states that "movement of the MCL line of the VOC plume is expected to be minimal". This statement does not seem to be substantiated in either the proposed plan or the focussed feasibility study however it appears to be a primary basis for the preferred remedy. Please provide further explanation of this statement.



Department of Toxic Substances Control



Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Edwin F. Lowry, Director
5796 Corporate Avenue
Cypress, California 90630

Gray Davis
Governor

August 13, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Marine Corps Air Station El Toro
Base Realignment and Closure
P.O. Box 51718
Irvine, California 92619-1718

DRAFT SITE CLOSURE REPORT, VADOSE ZONE REMEDIATION, OPERABLE UNIT (OU) 2A, INSTALLATION RESTORATION PROGRAM SITE 24, VOLATILE ORGANIC COMPOUND (VOC) SOURCE AREA, MARINE CORPS AIR STATION (MCAS) EL TORO

Dear Mr. Gould:

The Department of Toxic Substances Control (DTSC) reviewed the above-referenced document dated June 2001. The closure report presents the results of the vadose zone remediation conducted at IRP Site 24. IRP Site 24 consists of approximately 200 acres in the southwest quadrant of MCAS El Toro that includes two large aircraft hangars (designated as hangars 296 and 297) and several small buildings used for aircraft and vehicle maintenance. During the remedial investigation, two VOC source areas within Site 24 were identified, one for trichloroethene (TCE) and the other for tetrachloroethene (also referenced as perchloroethene (PCE)). Soil vapor extraction (SVE) was the selected remedy for these source areas in the vadose zone in the *Draft Final Interim Record of Decision, OU-2A, Site 24 VOC Source Area, Vadose Zone* (Bechtel National, Incorporated, 1997). Subsequently, the SVE system was installed in April/May 1999. The report recommends that the remediation goals at Site 24 have been attained and requests closure of the vadose zone remediation.

DTSC forwarded concurrence with the proposed verification sampling strategy in a letter dated August 18, 2000. In that letter, DTSC reiterated that VOCs in contaminated groundwater and/or diffusion from fine-grained soil may cause a rebound of VOC concentrations in the vadose zone. After review of the report, DTSC continues to be concerned about off-gassing of VOCs from groundwater and has the following comments.

1. The remedial action objectives (RAOs) for this vadose zone remediation are as follows:

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at www.dtsc.ca.gov.

Mr. Dean Gould
August 13, 2001
Page 2

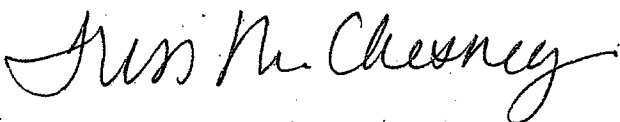
- Reduce concentrations of VOCs in the VOC source areas to prevent or minimize further degradation of the shallow groundwater unit above the maximum contaminant levels (MCLs) for drinking water.
- Continue vadose zone remediation until VOC soil gas concentrations are below the threshold concentration (concentrations capable of contaminating the shallow groundwater unit above the MCLs).

Groundwater remediation has not commenced and as a result, VOC off-gassing (in addition to diffusion from fine-grained soil) could cause the VOCs in the vadose zone to exceed the respective threshold levels. As a result, the second RAO has not been attained. Therefore, closure of the vadose zone remediation is not appropriate. The SVE system should be maintained to operate in the event that VOC concentrations rebound in the vadose zone.

2. DTSC recommends that the Department of the Navy develop a monitoring plan that includes an appropriate sampling protocol to collect representative soil gas samples for monitoring low levels of VOCs. The vadose zone should be monitored periodically for rebound (with no extraction) of VOCs in soil gas. Please refer to the enclosed comments from the DTSC Engineering Services Unit (ESU) for additional detail.
3. DTSC agrees with the recommendation provided in Section 4.2 that an evaluation of whether the SVE system could complement the Site 24 groundwater remedy will be performed prior to decommissioning.

In addition to the comments provided above, please address the enclosed comments prepared by the DTSC ESU. Please contact me at (714) 484-5395 if you have any questions.

Sincerely,



Triss M. Chesney, P.E.
Remedial Project Manager
Southern California Branch
Office of Military Facilities

Enclosure

cc: See next page



Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Department of Toxic Substances Control

Edwin F. Lowry, Director
5796 Corporate Avenue
Cypress, California 90630



Gray Davis
Governor

MEMORANDUM

TO: Triss Chesney, P.E.
Project Manager
Office of Military Facilities

VIA: John Hart, P.E. *Mark Becher for*
Chief, Engineering Services Unit

FROM: Tizita Bekele, P.E. *Tizita Bekele*
Hazardous Substances Engineer
Engineering Services Unit

DATE: August 9, 2001

SUBJECT: VADOSE ZONE REMEDIATION IRP SITE 24, VOLATILE ORGANIC
COMPOUNDS SOURCE AREA - MARINE CORPS AIR STATION, EL
TORO, CALIFORNIA

Document reviewed:

The Engineering Services Unit (ESU) has reviewed the Vadose Zone Remediation IRP Site 24, Volatile Organic Compounds Source Area - Marine Corps Air Station, El Toro, California, prepared by Earth Tech, dated June 2001.

General Comments:

The document states that the remedial action objectives (RAOs) have been met and recommends closure of the vadose zone remediation. One of the two RAOs to reduce volatile organic compounds (VOCs) in the source area appears to be met. However, the second objective, to continue vadose zone remediation until VOC soil gas concentrations are below the established threshold levels has not been attained. Due to off-gassing of VOCs from groundwater, the potential for trichloroethylene (TCE) concentration in the vadose to exceed the soil gas threshold level exists. Therefore, consistent with the RAOs, continued vadose zone remediation may be required until the groundwater (GW) is remediated to a level that will not cause the TCE in vadose zone to exceed the threshold level.

Specific Comments:

1. Depth-specific soil gas samples were collected from 10 extraction wells using PneuLog sampling conducted from November 29, 1999 through December 3, 1999. The results indicate that concentrations of TCE in four of these wells exceeded the 27 ug/L soil gas threshold level potentially due to off-gassing of VOCs from GW to the vadose zone. TCE was detected in soil gas at concentrations of 59 ug/L in 24SVE147A and at 110 ug/L in 24SVE51 which are close to the baseline concentrations of 58 and 137 ug/L in these wells respectively. We agree with the GW evaluation assessment in the document that TCE concentrations in groundwater remain above the level at which off-gassing could potentially result in soil gas TCE concentrations above 27 ug/L. This indicates the need for vadose zone monitoring of VOCs until the GW is remediated to a level at which off-gassing will not result in exceedance of TCE threshold level in vadose zone. It may also be necessary to continue remediating the vadose zone until the 27 ug/L TCE threshold level is achieved. Therefore, closure of the vadose zone remediation is not appropriate until the second RAO is met.
2. Soil gas samples collected by PneuLog method show higher concentrations of TCE than samples collected during the monitoring and/or the rebound sampling during October 1999 and February 2000. The concern is that while the monitoring, rebound and closure samples show TCE below the 27 ug/L threshold level, the PneuLog evaluation showed generally higher concentrations. Four of the wells had TCE concentrations above 27 ug/L. The rebound and closure samples were collected according to the current 24-hour purging protocol which may have been appropriate when elevated levels of VOCs were present in the vadose zone. However, as the vadose zone around the extraction wells could be the cleanest, the rebound concentrations of TCE are likely diluted and result in low concentrations when samples are collected from extraction wells with the 24-hour purge. Therefore, we recommend that the Navy re-evaluate and propose an appropriate sampling protocol in order to collect representative soil gas samples for monitoring low levels of TCE due to off-gassing from GW and/or rebound as a result of TCE diffusion from fine grain soil sources within the vadose zone.

If you have any questions, please contact me a (714) 484-5450.



Department of Toxic Substances Control



Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Edwin F. Lowry, Director
5796 Corporate Avenue
Cypress, California 90630

Gray Davis
Governor

August 17, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Marine Corps Air Station El Toro
Base Realignment and Closure
P.O. Box 51718
Irvine, California 92619-1718

DRAFT FINAL PHASE II FOCUSED FEASIBILITY STUDY, OPERABLE UNIT (OU) 3,
INSTALLATION RESTORATION PROGRAM (IRP) SITE 16, CRASH CREW
TRAINING PIT NO. 2, MARINE CORPS AIR STATION (MCAS) EL TORO

Dear Mr. Gould:

The Department of Toxic Substances Control (DTSC) reviewed the above report dated June 2001, and received by this office on June 19, 2001. The draft final report documents the Phase II Focused Feasibility Study (FS) conducted for IRP Site 16, Crash Crew Training Pit No. 2. Site 16 is located in the northwest quadrant of the station, in the center of the airfield near the intersection of Runways 34-16 and 25-07. The site consists of three unlined pits formerly used for crash crew (firefighter) training.

After review of the document, DTSC has the following comments:

1. Section 4.2.2.2, Compliance with ARARs [Applicable or Relevant and Appropriate Requirements]: "Alternative 2 is expected to ultimately meet the remediation goals of groundwater."

The discussion for Alternative 2, Long-Term Groundwater Monitoring with Deed Restrictions, in Section 3.2.2 states that modeling results predict that the trichloroethene (also referenced as trichloroethylene or TCE) plume may migrate up to 1,300 feet downgradient from its current position. The following Remedial Action Objectives [RAOs] are identified for Site 16 in Section 2.1.4:

- "Prevent domestic use of the shallow groundwater unit beneath Site 16 containing VOCs above MCLs [maximum contaminant levels]."

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at www.dtsc.ca.gov.

- Prevent further migration of VOC-contaminated groundwater from the source area.
- Remove, to the extent feasible, VOCs above MCLs dissolved in the shallow groundwater unit beneath Site 16."

Alternative 2 does not prevent further migration of VOC-contaminated groundwater from the source area and will not satisfy the second RAO.

2. Table 5-1, Comparative Analysis of Remedial Alternatives for Groundwater at Site 16: As part of the Criteria for "Long-Term Effectiveness and Permanence," the "Magnitude of Residual Risk From Groundwater" was evaluated.

This evaluation should include the incremental cancer risk (carcinogenic effects) and hazard index (non-carcinogenic effects) associated with the site for multiple media and applicable exposure pathways after the remedial action is complete.

3. Appendix A, Applicable or Relevant and Appropriate Requirements: In general, references to the California Code of Regulations can be abbreviated as in the following example, Title 22, California Code of Regulations, Section 66261.24 (22 CCR 66261.24).
4. Appendix A, Table A2-3, Potential Federal Chemical-Specific ARARs by Medium, Groundwater: The requirement for "Definition of a Hazardous Waste" is also potentially applicable for extracted groundwater generated from monitoring activities for Alternative 2.
5. Appendix A, Table A2-4, Potential State Chemical-Specific ARARs by Medium, Groundwater, Surface Water, Soil, and Air: The requirement for "Definition of a 'non-RCRA [Resource Conservation and Recovery Act] hazardous waste'" is also applicable to groundwater generated from monitoring activities for Alternative 2.
6. Appendix A, Section A4.2.1, Deed Restrictions: The second sentence in the second paragraph states, "State statutes that have been accepted by the DON as potential ARARs for implementing institutional controls and entering into an environmental restriction covenant and agreement with DTSC include substantive provisions of Cal. Civ. Code [California Civil Code] § 1471 and Cal. Health & Safety Code §§ 25202.5, 25222.1, and 25233(c)."

California Health and Safety Code can be abbreviated as "HSC."

Additionally, please insert "25232(b)(1)(A) through (E)" before "and 25233(c)."

7. Appendix A, Section A4.2.1, Deed Restrictions: The fourth paragraph begins, "The substantive provisions of Cal. Health & Safety Code § 25202.5 . . ."

After the fourth paragraph, please insert the following paragraph, "Actual land use restriction requirements are set forth in HSC subparagraphs 25232(b)(1)(A) through (E). These include prohibitions on construction of residences, hospitals for humans, schools for persons under 21 years of age, day care centers, or any permanently occupied human habitation on hazardous waste property. HSC paragraph 25233(c) sets forth substantive criteria for granting variances from the uses prohibited in HSC subparagraphs 25232(b)(1)(A) through (E) based upon specified environmental and health criteria."

8. Appendix A, Section A4.2.1, Deed Restrictions: The fourth sentence in the fifth paragraph states, "The DON will comply with the substantive requirements of Cal. Health & Safety Code § 25222.1 by incorporating CERCLA use restrictions, which are also consistent with the substantive requirements of Cal. Health & Safety Code § 25233(c), into the Don's deed of conveyance in the form of restrictive covenants under the authority of Cal. Civ. Code § 1471."

Please insert "subparagraphs 25232(b)(1)(A) through (E)" before "§ 25233(c)."

9. Appendix A, Section A4.2.1, Deed Restrictions: The sixth paragraph states, "In addition to being implemented through the environmental restriction covenant and agreement between the DON and DTSC, the appropriate and relevant portions of Cal. Health & Safety Code §§ 25202.5, 25221.1, and 25233 and Cal. Civ. Code § 1471 shall also be implemented through the deed between the DON and the transferee."

Please insert "25230, 25232" before "and 25233."

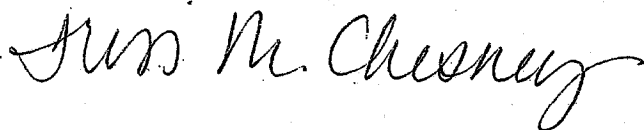
10. Appendix A, Table A4-2, Potential State Action-Specific ARARs: The entry for "Land-use controls" under the HSC include the following citations, HSC 25202.5, 25222.1, and 25233(c).

Please include HSC subparagraphs 25232(b)(1)(A) through (E) in the list of citations. Additionally, please modify the comments to include a description of these citations.

Mr. Dean Gould
August 17, 2001
Page 4

In addition to the comments provided above, please address the enclosed comments prepared by the DTSC Engineering Services Unit. If you have any questions, please contact me at (714) 484-5395.

Sincerely,



Triss M. Chesney, P.E.
Remedial Project Manager
Southern California Branch
Office of Military Facilities

Enclosure

cc: Ms. Nicole Moutoux
Remedial Project Manager
U. S. Environmental Protection Agency Region IX
Superfund Division (SFD-8-1)
75 Hawthorne Street
San Francisco, California 94105-3901

Ms. Patricia Hannon
Remedial Project Manager
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3339

Mr. Gregory F. Hurley
Restoration Advisory Board Co-chair
620 Newport Center Drive, Suite 450
Newport Beach, California 92660-8019

Ms. Polin Modanlou
Environmental Remediation Manager
MCAS El Toro Local Redevelopment Authority
Building 83
P.O. Box 53010
Irvine, California 92619-3010



Department of Toxic Substances Control



Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Edwin F. Lowry, Director
1001 I Street, 25th Floor
P.O. Box 806
Sacramento, California 95812-0806

Gray Davis
Governor

MEMORANDUM

TO: Triss Chesney, P.E., Project Manager
Office of Military Facilities - R4
(714) 484-5395 FAX (714) 484-5437

VIA: Mark Benhail for
John Hart, P.E., Chief
Engineering Services Unit - HQ
(916) 322-5265 FAX (916) 323-3700

FROM: [Signature]
Laszlo Saska, P.E., Hazardous Substances Engineer
Engineering Services Unit - HQ
(916) 323-3283 FAX (916) 323-3700

DATE: July 31, 2001

SUBJECT: *Draft Final Phase II Focused Feasibility Study, OU-3 IRP Site 16, Marine Corps Air Station, El Toro, by Bechtel National, Inc., dated June 2001*

We have reviewed the above draft Focused Feasibility Study (dFFS) by Bechtel National, Inc., on behalf of the Department of the Navy (Navy). We would like to offer the following comments and recommendations for your consideration.

Summary:

We have identified several issues which require resolution before a final version of the document is produced. The issues are: interpretation and use of the results of the rebound testing, calculation of soil gas threshold concentrations, remaining contaminant levels, and estimation of costs of remedial alternatives. These issues are discussed in detail below.

Comments:

1) Section 1.3.4.2, MPE Rebound Testing Rationale, page 1-48: We have previously identified our technical concerns regarding the use of the results of the multiphase extraction system (MPE) rebound testing. We continue to maintain that the results of the rebound testing are not adequate to predict long-term vapor concentrations, and, thus, cannot be used to base the closure of the vadose zone at Site 16.

First, clarification of terms. Normally, soil vapor extraction (SVE) or its enhancement, the MPE, is first operated in a full-scale mode. This mode removes the bulk of the recoverable subsurface contamination. Full-scale operation continues until the influent vapor concentrations decay to very low levels. Then, pulsed operation begins. The pulsed mode is used to reduce operational costs while continuing the extraction of diminished vapors from the subsurface. In this operational mode, either the entire well system, or only selected wells are operated in a time-limited, pulsed basis. Pulsed operation normally continues for several weeks. Because subsurface vapor concentrations always recover or rebound to a certain level following the cessation of vapor extraction activities, long-term monitoring of subsurface vapors must follow the pulsed operation mode to ensure that the vapor rebound does not exceed the cleanup level.

Thus, the brief activity that was just completed at Site 16, we would term a monitored pulsed operation of the MPE system. The Navy calls it rebound testing. Regardless of terminology used, we feel that there is a need for the continued long-term monitoring of subsurface vapors. The Navy, however, feels that its rebound testing, which quickly followed after the full-scale operation, produced reliable data on which to base the Site 16 vadose zone closure decision. We disagree.

The intent of monitoring the vadose zone following a pulsed operation of a SVE or MPE system is to determine the trends in subsurface soil vapor concentrations. The trends, in turn, can then be extrapolated into the long-term future in an attempt to predict future soil vapor concentrations levels, examine whether those predicted levels are acceptable, and thus determine whether vadose zone closure is warranted. Clearly, the longer one allows the soil vapors to equilibrate in the subsurface during monitoring, the more representative those extrapolations will be of the long-term. Thus, the preference is to monitor concentration levels over as long of a time period following after the soil vapor extraction activities as practical and realistic. We cannot consider twenty-eight days as an adequate amount of time from which to predict long-term soil vapor concentration levels, and on which to base vadose zone closure decisions. Soil vapor rebound monitoring should continue over at least a six-month period.

The Navy provided several lines of rationale to state that the 28-day time period is sufficient to conduct a rebound test at Site 16.

The first line of rationale cited is the observed long-term decreasing rate of decline of extracted soil vapor concentration. With possibly a few short-lived exceptions, the trend describing the decay of extracted soil vapor concentration data always exhibits a decreasing rate of decline. This trend is not unique to Site 16 and is an expected trend that is also sometimes called the diminishing rate of return. It is unclear how the cited decreasing rate of decline of soil vapor concentration supports the conclusion that 28-days is sufficient after which to conduct a soil vapor rebound monitoring.

The second line of reasoning noted by the Navy is similar to the first rationale noted above: the contaminant mass extraction exhibits a decreasing rate of decline. As noted by the Navy, this is because the contaminant mass extraction rate is simply the product of the extraction flow rates and the corresponding concentration values. Unless, the extraction flow rate is varied greatly during the extraction activities, the trend of the mass extraction rate would parallel the decay trend exhibited by the vapor concentration levels. Again, the direct relevance to the vapor rebound monitoring remains unclear.

The third line of rationale cited by the Navy is based on the observation that subsurface vacuum levels stabilized within one hour following a change in applied extraction vacuum. This observation is related to the air permeability of the subsurface, not to the rate of diffusion of contaminants from tight soil formations which is the primary cause of vapor concentration rebound. Volatilization from the groundwater is another major cause of vadose zone concentration rebound.

The fourth line of rationale notes that over 72 percent of the total contaminant mass has been recovered by the extraction system to date. The Navy originally predicted the Site 16 total contaminant inventory to be about 60 pounds. After discovering that the extraction system recovered contaminants in excess of that, but with more subsurface contamination clearly remaining, the Navy revised upward its site contaminant inventory to about 100 pounds. The Navy has done that by re-interpreting historical soil sampling data which exhibited concentration levels below detection limits. Re-interpreting historical sampling results to fit currently observed data cannot be accepted as good science and will not produce particularly credible arguments. Estimation of site contaminant inventory is invariably uncertain and seems to produce consistent underestimates. The use of estimated site contaminant inventory should not be used to advance arguments for site closure.

As noted above, the rebound of soil vapor concentration levels can be traced, among other possibilities, to diffusion of residual contaminants from tight formations and

volatilization of contaminants from contaminated groundwater. Specific parameters that can govern the trends in vapor rebound are the amounts and thicknesses of low permeability soil lenses, the rate of diffusion of contaminants from those lenses, the amount of contaminants remaining in those low permeability lenses, level and extent of groundwater contamination, etc. While such parameters can be estimated based on subsurface data, only long-term monitoring can begin to indicate what the real rate and magnitude of soil vapor rebound may be in the future.

We recommend that the vapors in the vadose zone at Site 16 be subjected to long-term monitoring over more reasonable and agreed upon time periods (and additional pulsed operations, if needed). Only after the results of the long-term monitoring verify compliance with cleanup levels, can a decision be made about the closure of the Site 16 vadose zone.

2) Section 1.3.5.5, Mass Loading Threshold Estimates, page 1-111:

The dFFS fails to provide adequate supporting information on the estimation of the threshold trichloroethene (TCE) mass loading concentration (estimated to be 83 µg/l). This is a critical parameter to the vadose zone remediation process, and we would like to fully evaluate the mathematical basis of it before we can concur. We would like to see an appendix dedicated to the transport modeling and would like to include printouts of all relevant modeling parameters, such as inputs, outputs, boundary conditions, etc.

In addition, the dFFS used a so-called "modeling factor" to estimate the threshold soil gas concentration values for the other volatile organic compounds (VOCs) at Site 16. Such an approach is troublesome because the soil threshold calculation is based on contaminant-specific properties, such as Henry's law constants, various partitioning coefficients, etc. Therefore, we request that specific threshold level calculations be done for those contaminants whose soil gas threshold values are quite low. These contaminants are benzene and 1,2-dichloroethane.

3) TCE Levels During the Rebound Test: Dynamic TCE concentration levels in well 16MPE1 from 6-April through 11-April-2001 were measured to be consistently above the proposed 32 µg/l threshold level, as shown in Tables 1-8 and 1-13. This is not discussed in the dFFS. Then on 12-April-2001, after the active extraction ceased, the static TCE concentration dropped to 10 µg/l in well 16MPE1, as shown in Table 1-7. We are puzzled at the apparent drop in the concentration of TCE. We would like to evaluate the hypothesis the Navy may have developed to explain such a phenomena, as well as evaluate the Navy's position about well 16MPE1 producing TCE vapors in excess of the Navy's proposed soil vapor threshold value, especially in light of the fact that subsurface soil vapor concentrations are bound to increase with time.

It is also interesting to note that during 4-April-2001 through 11-April-2001 rebound

testing period, an additional 2.6 pounds of TCE was removed. This is a significant amount, and one that suggests that a continued pulsed mode of operation may be worthwhile. We recommend that the Navy address this issue.

4) Remedial Cost Estimates: Several problems are evident with the remedial cost estimates presented in Section 4 and Appendix B of the dFFS which subsequently make the presented results difficult to interpret..

The dFFS employed the Remedial Action Cost Engineering and Requirements (RACER) software to develop the remedial cost estimates for the remedial alternatives of Site 16. RACER is an excellent tool to estimate remedial costs. The Department of Toxic Substances Control uses RACER consistently and with good result to estimate remedial costs, and fully endorses its use.

However, it appears that a conceptual error was made in the use of RACER's output: RACER includes a concept called "escalation," which is really a correction for inflation. (RACER, unfortunately, does not allow the user to adjust the internal escalation rate — an unfortunate drawback of RACER — and that makes "escalation" not a particularly useful feature in RACER.) The dFFS based its present worth calculations on RACER's "escalated" figures. Unfortunately, since present worth calculations already implicitly include inflation, the dFFS effectively counted inflation twice. This invalidates the present worth figures for Site 16. When using RACER, present worth figures must be based on the "unescalated" (i.e. uninflated) RACER figures.

Also, it is very difficult to verify the accuracy of the present worth figures presented because of the format in which the dFFS presents the cost line items. We suggest that all subtotal cost figures be presented as present worth cost. Thus, there should be present worth subtotals listed for capital, operations and maintenance (O&M), monitoring, etc. categories.

The present worth calculations should be based on a baseline date which generally represents the start date of one or more of the projects. In the case of Site 16, a reasonable baseline year would be January 2002. Furthermore, all cost items, including line item subtotals should be expressed as dollar amounts of that base year. For instance, all capital, O&M, monitoring, etc., cost items should be listed in January 2002 dollars.

Finally, all line items should be expressed as completely marked-up figures, that is as the sum of direct costs and mark-ups (indirect costs). Breaking out the indirect costs as a separate line item, as the dFFS had done in Appendix B, makes it impossible to determine what portions of it are attributable to capital and O&M costs.

A possible format for presenting cost estimates is attached.

Triss Chesney
Draft Focused FS, Site 16 Vadose Zone
July 31, 2001
Page 6

Otherwise, we concur with the use of the four percent discount rate (seven percent rate of return minus the three percent inflation) as an appropriate and conservative rate for present worth calculations.

* * *

Should you have any questions, please do not hesitate to contact me at the above number.

Triss Chesney
 Draft Focused FS, Site 16 Vadose Zone
 July 31, 2001
 Page 7

Alt 1

Project Name: xxxxxxxx
 Project ID: xxxxxxxx
 Site Name: RA 1
 Site ID: RA 1
 Phase Element Name: RA 1 Mod.
 Phase Element Type: RD/RA
 Labor Rate Group: System Labor Rate
 Analysis Rate Group: System Analysis Rate
 Approach: Ex Situ

Discount rate: 0.05

Phase Element Name

RI / FS

Remedial Design

Professional Labor Management

Extraction Wells (10-yrs)

Carbon Adsorption (Liquid) (10-yrs)

Carbon Adsorption (Gas) (10-yrs)

Five-year reviews (100-yrs)

Miscellaneous (10-yrs)

Filtrate / sludges (sampling) (10-yrs)

Ambient air (sampling) (10-yrs)

General Monitoring (labor, mgmt.) (10-yrs)

RA-1 Mod. Total Project Cost

Annual Average O&M (1-10 Yrs)

Annual Average O&M (10-100 Yrs)

Location: LOS ANGELES, CA
 Media/Waste Type: Free Product
 Secondary Media/Waste Type: Groundwater
 Contaminant: Volatile Organic Compounds (VOCs)
 Secondary Contaminant: None
 Markup Template: System Defaults
 Start Date: 1/1/03 (Capital) 1/1/04 (O&M)

Capital Cost \$Y2001	Annual Average O&M * \$Y2001	Total O&M \$Y2001	O&M Present Worth \$Y2001	Project Present Worth \$Y2001
\$700,000				\$700,000
\$183,000				\$183,000
\$471,000				\$471,000
\$459,000	\$32,000	\$320,000	\$250,000	\$709,000
\$628,000	\$564,000	\$5,640,000	\$4,350,000	\$4,978,000
\$2,000	\$14,000	\$140,000	\$110,000	\$112,000
	\$9,000	\$860,000	\$540,000	\$540,000
	\$86,000	\$860,000	\$640,000	\$640,000
	\$9,000	\$90,000	\$70,000	\$70,000
	\$2,000	\$20,000	\$10,000	\$10,000
	\$166,000	\$1,660,000	\$1,280,000	\$1,280,000
\$2,443,000		\$9,590,000	\$7,250,000	\$9,695,001
	\$882,000			
	\$9,000			



California Regional Water Quality Control Board

Santa Ana Region



iston H. Hickox
Secretary for
Environmental
Protection

Internet Address: <http://www.swrcb.ca.gov/rwqcb8>
3737 Main Street, Suite 500, Riverside, California 92501-3348
Phone (909) 782-4130 - FAX (909) 781-6288

Gray Davis
Governor

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption.
For a list of simple ways you can reduce demand and cut your energy costs, see our website at www.swrcb.ca.gov/rwqcb8.*

August 7, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Base Realignment & Closure, Environmental Div.
P O Box 51718
Irvine, CA 92619 -1718

COMMENTS ON 30% SUBMITTAL REMEDIAL DESIGN OPERABLE UNIT 2B, LANDFILL SITES 2 AND 17, FORMER MARINE CORPS AIR STATION, EL TORO

Dear Mr. Gould:

We have completed our review of the above-referenced document, dated February 2001, which we received on February 6, 2001. We have the following comments:

1. Please provide the following details:
 - a. Provide information to demonstrate that the proposed engineered alternative can be expected to meet or exceed the water quality protection afforded by the prescriptive standard design (PSD) for the landfill cover, as defined in the California Code of Regulations (CCR) Title 27.
 - b. Indicate the thickness, construction methods, testing methods and testing frequencies you propose to use in constructing and evaluating the test pad.
 - c. Describe the methods to be used in evaluating the long-term performance of the cover (for example, measurement of the volume and rate of infiltration of moisture into the cover; moisture content of the soil cover; and the effectiveness of the plants in balancing the moisture content within the cover).
2. **Page 1-1 Section 1.1 Project Summary**
Groundwater monitoring for Site 2 is not discussed in your report. Please provide the details of the site's groundwater monitoring program and the background water quality, as defined by your existing groundwater monitoring network.
3. **Page 2-6 Table 2-3**
The HELP model is not an acceptable model for determining infiltration rates through unsaturated soil. Therefore, the HELP model should not be used as a basis for selecting

California Environmental Protection Agency



Recycled Paper

the cover thickness. In our previous comments on the landfill cover design issues, which we provided to you in correspondence dated October 29, 1996 (see Attachment 1) and June 17, 1999 (see Attachment 2, 2nd page), we suggested that you use a model for unsaturated flow, such as UNSAT-H or LEACH-M. A minimal effort in such modeling, using UNSAT-H, was conducted in 1998. You included the results of this effort in your October 22, 1998, Draft Technical Memorandum, UNSAT-H Infiltration Modeling for Landfill Covers. On December 3, 1998 we sent our comments (see Attachment 3) on the input parameters you had used in the running of the UNSAT-H model; however, we did not receive a response to our comments. Before you can propose a landfill cover design, you must demonstrate that you have thoroughly researched and evaluated the anticipated infiltration rates and moisture balance in the soil that you have selected for use in the cover.

4. **Page 2-12 Section Seismic Hazard Evaluation/Stability/Settlement**

Based on the description of the waste (page 1-1 and A1-1) that was placed in these landfills, and in consideration of the likelihood of continued seismic activity in Southern California, we recommend that the cover be designed to withstand the maximum credible earthquake for the Irvine area.

5. **Page 2-13 Section 2.5.5.1 Hydrologic Analysis, second paragraph**

Please review and correct the citation. See Title 27 CCR 21750, 20250 (c) and 20260 (c).

6. **Page 2-14 Section 2.5.5.3 NPDES Requirements**

Please cite the RWQCB order number, the NPDES permit number, and discuss the type of discharge in this section.

7. **Page 2-14 Section 2.5.6 Dust and Erosion Control**

Please include a description of the erosion control measures that will be implemented during grading and construction activities at the landfill. Please describe the erosion control features that will remain in place at the landfill after the cover construction is completed. Please explain the steps that will be taken to ensure that water does not infiltrate into the refuse via the rip-rap areas at Site 2.

8. **Page 2-16 Section 2.6.1 Plant Materials**

In order to determine potential infiltration rates and calculate the appropriate thickness of the monolithic layer, you must identify the plant species (including a description of their typical rooting depths) that will be used to balance the moisture content of the cover. The plants are a key element in removing moisture and preventing infiltration beyond the root zone and into the cover.

9. **Map C-3, Site 17, Final Grading Plan**

In order to provide adequate drainage, and control storm water run-on, please modify your design to include a drainage channel along the western side of the landfill. The design

details should include calculations to verify the proper design capacity for the channel. Please also show the proposed perimeter fence and access point(s) for site entry.

10. **Attachment A, Geotechnical Engineering Evaluation**

- a. **Page A1-5, Site 2 - Landfill Exploration and Cross-Sectional Locations Map**
Please reference the location of the cross sections.
- b. **Page A1-7 Site 17**
Same comment as for Page A1-5.
- c. **Page A1-18, Section A1.4 Regulatory Requirements for Seismic Design, last sentence**
Please correct your citation. Stability analysis is not discussed in Section 20370.
- d. **Page A6.21, Section A6.4.1 Strong Ground Motions**
Please change maximum capable to maximum credible earthquake.
- e. **Page A6-45 Well 2-NEW1** is located more than 400 feet from this cross-section, according to Figure A1-2. Please correct the cross-section. Well number UGMW25 could not be located on Figure A1-2; please show the well location on the map.
- f. **Section A7 Stability of Landfill Slopes and Proposed Cover System**
It is not clear in this section if analysis was conducted for both the maximum probable earthquake (MPE) and the maximum credible earthquake (MCE), or only for the MPE. Please provide a clear description of the slope stability analysis that was conducted.

11. **Page B1-3 Figure B1-1 Site 2-Existing Conditions Showing HEC-RAS Cross Sections**

Please show the locations of Reach 1, Reach 2, and Reach 3.

12. **Attachment C, Pre-Design Investigation**

- a. **Page C2-9, Section C2.3 Site 2 Perimeter Gas Wells**
Please provide a reference to the map or figure that shows the locations of the landfill gas collection wells.
- b. **Page C2-10, Section C2.4 Site 17 Lysimeter Sampling**
Please provide a reference to the map or figure that shows the locations of the lysimeters.

13. We also request a copy of the Health and Safety plan, addressing all phases of the landfill cover construction project.



Mr. Gould

-4-

August 7, 2001

If you should have any questions, please call me at (909) 782-4498, or send e-mail to phannon@rb8.swrcb.ca.gov.

Sincerely,



Patricia A. Hannon
SLIC/DoD/AGT Section

Attachments:

1. Letter dated October 29, 1996
2. Letter dated December 3, 1998
3. Letter dated June 17, 1999

cc w/ attachments: Ms. Triss Chesney, Dept. of Toxic Substances Control
Mr. Gregory F. Hurley, RAB Co-Chair MCAS El Toro
Ms. Polin Modanlou, MCAS El Toro Local Redevelopment Authority
Mr. Don Whittaker, Naval Facility Engineering Command, SWDIV
Ms. Nicole Moutoux, U. S. EPA, Region IX

PAH:et_30rmd2a17.doc





California Regional Water Quality Control Board

Santa Ana Region



Justin H. Hickox
Secretary for
Environmental
Protection

Internet Address: <http://www.swrcb.ca.gov/rwqcb8>
3737 Main Street, Suite 500, Riverside, California 92501-3348
Phone (909) 782-4130 - FAX (909) 781-6288

Gray Davis
Governor

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption.
For a list of simple ways you can reduce demand and cut your energy costs, see our website at www.swrcb.ca.gov/rwqcb8.*

August 13, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Base Realignment & Closure, Environmental Div.
P O Box 51718
Irvine, CA 92619 -1718

**COMMENTS ON DRAFT SITE-SPECIFIC ENVIRONMENTAL BASELINE SURVEY
REPORT, IRP SITE 1, EXPLOSIVE ORDNANCE DISPOSAL RANGE AND DRAFT
FEDERAL AGENCY-TO- AGENCY PROPERTY TRANSFER, ENVIRONMENTAL
SUMMARY DOCUMENTS FOR CERTAIN PROPERTY (PARCEL 5A2), MARINE CORPS
AIR STATION, EL TORO**

Dear Mr. Gould;

We have completed our review of the above-referenced documents dated July 2001, which we received on July 16, 2001. We have no comments on these documents.

If you should have any questions, please call me at (909) 782-4498 or send e-mail to phannon@rb8.swrcb.ca.gov.

Sincerely,

Patricia A. Hannon
SLIC, DoD, AGT Section

cc: Ms. Triss Chesney, Dept. of Toxic Substances Control
Mr. Gregory F. Hurley, RAB Co-Chair MCAS El Toro
Ms. Polin Modanlou, MCAS El Toro Local Redevelopment Authority
Mr. Don Whittaker, Naval Facility Engineering Command, SWDIV
Ms. Nicole Moutoux, U. S. EPA, Region IX

California Environmental Protection Agency



Recycled Paper



iston H. Hickox
Secretary for
Environmental
Protection

California Regional Water Quality Control Board

Santa Ana Region

Internet Address: <http://www.swrcb.ca.gov/rwqcb8>
3737 Main Street, Suite 500, Riverside, California 92501-3348
Phone (909) 782-4130 - FAX (909) 781-6288



Gray Davis
Governor

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption.
For a list of simple ways you can reduce demand and cut your energy costs, see our website at www.swrcb.ca.gov/rwqcb8.*

August 20, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Base Realignment & Closure, Environmental Div.
P O Box 51718
Irvine, CA 92619 -1718

COMMENTS ON DRAFT SITE CLOSURE REPORT, VADOSE ZONE REMEDIATION, VOLATILE ORGANIC COMPOUND SOURCE AREA, IR SITE 24, MARINE CORPS AIR STATION, EL TORO

Dear Mr. Gould;

We have completed our review of the above-referenced document, dated June 2001, which we received on June 13, 2001. Based on the information in the report, we have the following comments:

1. **Page 3-5, Table 3-3 Closure Sampling Analytical Results**
Please add a data column listing the screened interval for each well that was sampled, in order to identify the depths from which the soil vapor samples were collected. In addition, please include the sampling dates.
2. **Plate A2, Vadose Zone Cross Section, TCE Source Area, Legend**
Please change the symbol description "monitoring well" to "groundwater monitoring well."

If you should have any questions, please call me at (909) 782-4498 or send e-mail to phannon@rb8.swrcb.ca.gov.

Sincerely,

Patricia A. Hannon
SLIC, DoD, AGT Section

cc: Ms. Triss Chesney, Dept. of Toxic Substances Control
Mr. Gregory F. Hurley, RAB Co-Chair MCAS El Toro
Ms. Polin Modanlou, Orange County Hall of Administration
Ms. Lynn Hornecker, Naval Facility Engineering Command, SWDIV
Ms. Nicole Moutoux, U. S. EPA, Region IX

California Environmental Protection Agency



Recycled Paper



Winston H. Hickox
Secretary for
Environmental
Protection

California Regional Water Quality Control Board

Santa Ana Region

Internet Address: <http://www.swrcb.ca.gov/rwqcb8>
3737 Main Street, Suite 500, Riverside, California 92501-3348
Phone (909) 782-4130 - FAX (909) 781-6288



Gray Davis
Governor

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption.
For a list of simple ways you can reduce demand and cut your energy costs, see our website at www.swrcb.ca.gov/rwqcb8.*

August 27, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Base Realignment & Closure, Environmental Div.
P O Box 51718
Irvine, CA 92619 -1718

COMMENTS ON DRAFT FINAL PHASE II FOCUSED FEASIBILITY STUDY REPORT, OU-3, SITE 16, FORMER MARINE CORPS AIR STATION (MCAS), EL TORO

Dear Mr. Gould:

We have completed our review of the above-referenced document dated June 2001, which we received on June 21, 2001. Based on the information in the report, we have the following comments:

Page 3-30 and 3-31 Table 3-2, Alternative 3, Influent Sample Analysis and Sampling Frequency

The influent sampling frequency for halogenated and aromatic VOCs and TPH is monthly, as stipulated in Order No. 96-18-181 for the discharge of treated groundwater at the former El Toro MCAS, IRP Site 16. Please correct this table.

Table 3-3, Alternative 3, Effluent Sample Analyses and Sampling Frequency

We do not believe that the proposed quarterly sampling schedule for the effluent would be sufficiently protective of the beneficial uses of Bee Canyon Wash. Effluent samples should be tested weekly for halogenated and aromatic VOCs and total petroleum hydrocarbons (TPH) through the first six months of operation of the treatment system. The effluent monitoring reports shall be submitted to the Regional Board monthly. Please see Discharge Authorization No. 96-18-181 for the discharge of treated groundwater at the former El Toro MCAS, IRP Site 16, and refer to the facility's Monitoring and Reporting Program, issued to the Navy by the Regional Board on February 21, 2001. If there are no violations of the discharge permit after the first six months of continuous operation of the treatment system, the Navy may request a reduction in the effluent monitoring frequency.

California Environmental Protection Agency



Recycled Paper

Mr. Gould

-2-

August 27, 2001

If you should have any questions, please call me at (909) 782-4498, or send e-mail to phannon@rb8.swrcb.ca.gov.

Sincerely,



Patricia A. Hannon
SLIC, DoD, AGT Section

cc: Ms. Triss Chesney, Dept. of Toxic Substances Control
Mr. Gregory F. Hurley, RAB Co-Chair MCAS El Toro
Ms. Polin Modanlou, MCAS El Toro Local Redevelopment Authority
Mr. Marc Smits, Naval Facility Engineering Command, SWDIV
Ms. Nicole Moutoux, U. S. EPA, Region IX

California Environmental Protection Agency



Recycled Paper



California Regional Water Quality Control Board

Santa Ana Region



Winston H. Hickox
Secretary for
Environmental
Protection

Internet Address: <http://www.swrcb.ca.gov/rwqcb8>
3737 Main Street, Suite 500, Riverside, California 92501-3348
Phone (909) 782-4130 - FAX (909) 781-6288

Gray Davis
Governor

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption.
For a list of simple ways you can reduce demand and cut your energy costs, see our website at www.swrcb.ca.gov/rwqcb8.*

September 10, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Base Realignment & Closure, Environmental Div.
P O Box 51718
Irvine, CA 92619 -1718

COMMENTS ON SUMMARY REPORT ON FORMER SILVER RECOVERY UNIT (SRU 3B) AT BUILDING 133, FORMER MARINE CORPS AIR STATION, EL TORO

Dear Mr. Gould;

We have completed our review of the above-referenced document, dated July 16, 2001, which we received on July 19, 2001. According to the report, a ten-foot section of the sewer line at the former Air Station was exposed in order to inspect the pipe. One soil sample was collected from approximately 1 foot below the pipe. The sample was analyzed for volatile organic compounds (VOCs) using EPA Method 8260, for silver, iron, and copper using EPA Method 6010, and for mercury using EPA Method 7471. VOCs, silver, and mercury were not detected above laboratory reporting limits. The concentrations of iron and copper were at or below the known background concentrations for those metals in soil at the former Air Station.

Based on the information in the July 16, 2001 report, we concur with your request for no further action at former Silver Recovery Unit (SRU 3B) at Building 133.

If you should have any questions, please call me at (909) 782-4498 or send e-mail to phannon@rb8.swrcb.ca.gov.

Sincerely,

Patricia A. Hannon
SLIC/DoD/AGT Section

cc: Ms. Triss Chesney, Dept. of Toxic Substances Control
Mr. Gregory F. Hurley, RAB Co-Chair MCAS El Toro
Ms. Polin Modanlou, MCAS El Toro Local Redevelopment Authority
Ms. Lynn Hornecker, Naval Facility Engineering Command, SWDIV
Ms. Nicole Moutoux, U. S. EPA, Region IX

California Environmental Protection Agency



Recycled Paper



California Regional Water Quality Control Board

Santa Ana Region



Winston H. Hickox
Secretary for
Environmental
Protection

Internet Address: <http://www.swrcb.ca.gov/rwqcb8>
3737 Main Street, Suite 500, Riverside, California 92501-3348
Phone (909) 782-4130 - FAX (909) 781-6288

Gray Davis
Governor

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption.
For a list of simple ways you can reduce demand and cut your energy costs, see our website at www.swrcb.ca.gov/rwqcb8.*

September 10, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Base Realignment & Closure, Environmental Div.
P O Box 51718
Irvine, CA 92619 -1718

COMMENTS ON SUMMARY REPORT ON FORMER SILVER RECOVERY UNIT (SRU) NUMBER 3A, BUILDING 46, FORMER MARINE CORPS AIR STATION, EL TORO

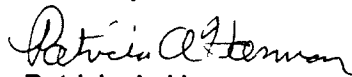
Dear Mr. Gould:

We have completed our review of the above-referenced document, dated May 30, 2001, which we received on May 31, 2001. According to the report, approximately 90 linear feet of the sewer line at the former Air Station were exposed, in order to inspect the pipe and to collect soil samples along the pipe trench. Twelve soil samples were collected from different locations along the trench, at approximately three feet below the exposed pipe. Five of the samples were analyzed for volatile organic compounds (VOCs) using EPA Method 8260. All of the samples were analyzed for silver, iron, and copper using EPA Method 6010, and for mercury using EPA Method 7471. VOCs, silver, and mercury were not detected above laboratory reporting limits. The concentrations of iron and copper were at or below the known background concentrations for those metals in soil at the former Air Station.

Based on the information in the May 30, 2001 report, we concur with the request for no further action at former Silver Recovery Unit Number 3A, Building 46.

If you should have any questions, please call me at (909) 782-4498, or send e-mail to phannon@rb8.swrcb.ca.gov.

Sincerely,


Patricia A. Hannon
SLIC/DoD/AGT Section

cc: Ms. Triss Chesney, Dept. of Toxic Substances Control
Mr. Gregory F. Hurley, RAB Co-Chair MCAS El Toro
Ms. Polin Modanlou, MCAS El Toro Local Redevelopment Authority
Ms. Lynn Hornecker, Naval Facility Engineering Command, SWDIV
Ms. Nicole Moutoux, U. S. EPA, Region IX

California Environmental Protection Agency



Recycled Paper



BECHTEL NATIONAL INC.

CLEAN II TRANSMITTAL/DELIVERABLE RECEIPT

Contract No. N-68711-92-D-4670

Document Control No.: CTO-0200/0319

File Code: 0216

TO: Contracting Officer
Naval Facilities Engineering Command
Southwest Division
Mr. Richard Selby, Code 02R1
1220 Pacific Highway
San Diego, CA 92132-5190

DATE: October 30, 2001

CTO #: 200 (EL2)

LOCATION: MCAS El Toro

FROM:

Thurman L. Heironimus
Thurman L. Heironimus, Project Manager

DESCRIPTION: MCAS El Toro, Public Information Materials 9/19/01 Restoration Advisory Board
Meeting Held at Irvine City Hall, Irvine, CA

TYPE: ☐ Contract Deliverable ☒ CTO Deliverable ☐ Other
(Cost) (Technical)

VERSION: N/A REVISION #: 0

ADMIN RECORD: Yes ☒ No ☐ Category ☐ Confidential ☐
(PM to Identify)

SCHEDULED DELIVERY DATE: 10/30/01 ACTUAL DELIVERY DATE: 10/30/01

NUMBER OF COPIES SUBMITTED: 0/5C/4E

COPIES TO (Include Name, Navy Mail Code, and No. of Copies):

SWDIV:

G. Tinker, 06CC.GT (O)
Basic Contract File, 02R1 (1C)
D. Gould, 06CM.DG (1C/1E)
D. Silva, 05G.DS (3C/3E - 2 for AR
1 for IR)

BECHTEL (Distributed by Bechtel):

B. Coleman (1C)
Document Control (1C/1E)

OTHER (Distributed by Bechtel):

O - Original Transmittal Sheet
C - Copy Transmittal Sheet
E - Enclosure

Date/Time Received